Wiring Diagrams

DIAGRAM INDEX

DIAGRAM INDEX

UNIT SCHEMATIC				
Unit 50TFQ	**Voltage-Phase-Hertz**	**Type**	**From Label Diagram**	**Figure No.**
004,005	208/230-1-60	Schematic/Component Arrangement	50DK508797	1
	208/230-3-60	Schematic/Component Arrangement	50DK508798	2
	460-3-60	Schematic/Component Arrangement	50DK508801	3
	575-3-60	Schematic/Component Arrangement	50DK508804	4
006	208/230-1-60	Schematic/Component Arrangement	50DK508797	1
	208/230-3-60	Schematic/Component Arrangement	50DK508799	5
	460-3-60	Schematic/Component Arrangement	50DK508802	6
	575-3-60	Schematic/Component Arrangement	50DK508805	7
007	208/230-3-60	Schematic/Component Arrangement	50DK508800	8
	460-3-60	Schematic/Component Arrangement	50DK508803	9
	575-3-60	Schematic/Component Arrangement	50DK508806	10
008-012	208/230-3-60	Schematic/Component Arrangement	50DK508808	11
	460-3-60	Schematic/Component Arrangement	50DK508809	12
	575-3-60	Schematic/Component Arrangement	50DK508810	13

ELECTRIC HEAT ACCESSORY WIRING

V-Ph-Hz	MOCP	Fig. No.
208/230-1-60	< 60 Amps	14
208/230-3-60, 460-3-60	< 60 Amps	15
208/230-1-60	> 60 Amps	16
208/230-3-60	> 60 Amps	17
460-3-60, 575-3-60	> 60 Amps	18

OPTION AND ACCESSORY WIRING

Description	50TFQ Unit Size	Fig. No.	Serial Number
Apollo Controls Wiring — Including Indoor Air Quality	004-012	19	From 2492Gxxxxx
Apollo Thermostat Wiring — Typical	004-007	20	From 0395Gxxxxx
	008-012	21	
Convenience Outlet Schematic	004-012	22	From 0798Gxxxxx
Durablade Economizer Wiring	004-012	23	From 3295Gxxxxx*
Differential Enthalpy Control (Durablade)	004-012	24	From 3295Gxxxxx*
Solid-State Enthalpy Control (Durablade)	004-012	25	From 3295Gxxxxx*
EconoMi$er Wiring	004-012	26	2099Gxxxxx – 0702Gxxxxx†
EconoMi$er Dry Bulb Sensor Wiring	004-012	27	2099Gxxxxx – 0702Gxxxxx
EconoMi$er Enthalpy Sensor Wiring	004-012	28	2099Gxxxxx – 0702Gxxxxx
EconoMi$er Power Exhaust Wiring with Switch in the Actuator	004-012	29	2099Gxxxxx – 4501Gxxxxx
EconoMi$er Power Exhaust Wiring with Switch Outside the Actuator	004-012	30	4501Gxxxxx – 0702Gxxxxx
EconoMi$er2 Wiring	004-012	31	From 0802Gxxxxx
Differential Enthalpy Wiring (EconoMi$er2)	004-012	32	From 0802Gxxxxx
Fire and Smoke Control Wiring (EconoMi$er2)	004-012	33	From 0802Gxxxxx
Indoor Air Quality Sensor Wiring (EconoMi$er2)	004-012	34	From 0802Gxxxxx
Power Exhaust, 208/230V and 575V Units (EconoMi$er2)	004-012	35	From 0802Gxxxxx
Power Exhaust for 460V Units (Economi$er2)	004-012	36	From 0802Gxxxxx
Economi$er2 with PremierLink™ or 4-20 mA Control	004-012	37	From 0802Gxxxxx
Emergency Heat Control with Single-Stage Electric Heater	004-007	38	
	008-012	39	
Emergency Heat Control with Two-Stage Electric Heater	004-007	40	
	008-012	41	
Factory-Installed Non-Fused Disconnect Schematic	004-012	42	From 0395Gxxxxx
Motormaster® I Control Wiring Details	004-012	43	
Motormaster II Control Wiring Schematic	004-007	44	
	008-012	45	
Motormaster IV Control Wiring Schematic	004-007	46	
	008-012	47	
Novar Controls Wiring (EMT3051)	004-012	48	From 2900Gxxxxx
Novar Controls Wiring (EMT2024)	004-012	49	From 2900Gxxxxx
PremierLink Controls Wiring	004-012	50	From 4601Gxxxxx
PremierLink Controls Wiring with Dual Terminal Block	004-012	51	From 4002Gxxxxx
Remote Control Panel Wiring	004-012	52	
Smoke Detector Shutdown	004-012	53	From 0802Gxxxxx
Time Guard II Device	004-012	54	
Two-Position Damper Wiring	004-012	55	
62AQ Energy$Recycler Accessory Wiring (Typical)	004-012	56	

*Durablade Economizer was a factory-installed option (FIOP) until 2/15/02; it is currently available only as a field-installed accessory.
†EconoMi$er wiring in Fig. 27 is generic (for units produced from 5/99 to 2/02) with the exception of the way the power exhaust switch is wired. Refer to Fig. 30 and 31 for more detailed power exhaust switch information.

SEQUENCE OF OPERATION

50TFQ004-012 Units

COOLING, UNITS WITHOUT ECONOMIZER — When thermostat calls for cooling, terminals G and Y1 are energized. The indoor-fan contactor (IFC), reversing valve solenoid (RVS1) and compressor contactor no. 1 (C1) are energized and indoor-fan motor, compressor no. 1, and outdoor fans start. The outdoor-fan motor(s) run continuously while unit is cooling. On 50TFQ008-012 units, if the thermostat calls for a second-stage of cooling by energizing Y2, compressor contactor no. 2 (C2) and reversing valve solenoid (RVS2) are energized and compressor no. 2 starts.

HEATING, UNITS WITHOUT ECONOMIZER (Sizes (004-007) — Set system switch at AUTO. or HEAT position. Set thermostat at desired temperature.

When the thermostat calls for heat, the IFC, outdoor-fan contactor (OFC), and compressor contactor are energized. The RVS is deenergized and switches position, and the indoor fan, outdoor fan, and compressor are energized.

If the thermostat calls for a second stage of heat, the heater contactor (HC) is energized and starts the electric heaters.

When the space temperature approaches the heating temperature set point, heating stages cycle off.

HEATING, UNITS WITHOUT ECONOMIZER (Sizes 008-012) — Upon a request for heating from the space thermostat, terminal W1 will be energized with 24 v. The IFC, outdoor-fan contactor (OFC), C1, and C2 will be energized. The reversing valves switch position and deenergize, and the indoor fan, outdoor fan, compressor no. 1, and compressor no. 2 are energized.

If the space temperature continues to fall while W1 is energized, W2 will be energized with 24 v, and the heater contactor(s) (HC) will be energized, which will energize the electric heater(s).

When the space thermostat is satisfied, W2 will be deenergized first, and the electric heater(s) will be deenergized.

Upon a further rise in space temperature, W1 will be deenergized, and the compressors will turn off.

COOLING, UNITS WITH DURABLADE ECONOMIZER — When the outdoor-air temperature is above the outdoor-air thermostat (OAT) setting and the room thermostat calls for cooling, compressor contactor no. 1 is energized to start compressor no. 1 and the outdoor-fan motor(s). RVS1 (reversing valve solenoid) is energized. The indoor-fan motor is energized and the economizer damper moves to the minimum position. Upon a further call for cooling, compressor contactor no. 2 will be energized (50TFQ008-012), starting compressor no. 2. RVS2 is energized. After the thermostat is satisfied, the damper moves to the fully closed position. When using continuous fan, the damper moves to minimum position.

When the outdoor-air temperature is below the OAT setting and the thermostat calls for cooling, the economizer dampers move to the minimum position. If the supply-air temperature is above 57 F, the damper continues to open until it reaches the fully open position or until the supply-air temperature drops below 52 F.

When the supply-air temperature falls to between 57 F and 52 F, the damper will remain at an intermediate open position. If the supply-air temperature falls below 52 F, the damper will modulate closed until it reaches the minimum position or until the supply-air temperature is above 52 F. When the thermostat is satisfied, the damper will move to the fully closed position. When using continuous fan, the damper moves to minimum position.

If the outdoor air alone cannot satisfy the cooling requirements of the conditioned space, economizer cooling is integrated with mechanical cooling, providing second-stage cooling. Compressor no. 1 reversing valve solenoid (RVS1) and the outdoor fan will be energized and the position of the economizer damper will be determined by the supply-air temperature. Compressor no. 2 (50TFQ008-012) is locked out.

When the second stage of cooling is satisfied, the compressor, RVS2, and outdoor-fan motor(s) will be deenergized. The damper position will be determined by the supply-air temperature.

When the first stage of cooling is satisfied, the damper will move to fully closed position. When using continuous fan, the damper moves to minimum position.

COOLING UNITS WITH ECONOMI$ER (EconoMi$er, Johnson Actuator, was produced from Unit Serial Numbers from 2009Gxxxxx to 0702Gxxxxx) (Sizes 004-007) — When the outdoor-air temperature (OAT) is above the ECON SP set point and the room thermostat calls for Stage 1 cooling, terminals G and Y1 are energized. The indoor-fan contactor (IFC), reversing valve solenoid (RVS1) and compressor contactor no. 1 (C1) are energized and indoor-fan motor, compressor no. 1 and outdoor fans start. The EconoMi$er damper modulates to minimum position. The outdoor-fan motor(s) runs continuously while unit is cooling. After the thermostat is satisfied, the damper modulates to the fully closed position when the IFM is deenergized.

When the OAT is below the ECON SP setting and the room thermostat calls for Stage 1 cooling (R to G + Y1), the EconoMi$er modulates to the minimum position when the IFM is energized. The EconoMi$er provides Stage 1 of cooling by modulating the return and outdoor-air dampers to maintain a 55 F supply air set point. If the supply-air temperature (SAT) is greater than 57 F, the EconoMi$er modulates open, allowing a greater amount of outdoor air to enter the unit. If the SAT drops below 53 F, the outdoor air damper modulates closed to reduce the amount of outdoor air. When the SAT is between 53 and 57 F, the EconoMi$er maintains its position.

If outdoor-air alone cannot satisfy the cooling requirements of the conditioned space, and the OAT is above the MECH CLG LOCKOUT set point, the EconoMi$er integrates free cooling with mechanical cooling. This is accomplished by the strategies below.

NOTE: Compressor has a 2-minute Minimum On, Minimum Off, and Interstage delay timer.

1. If Y1 is energized, and the room thermostat calls for Y2 (2-stage thermostat), the compressor, RVS1 and OFM are energized. The EconoMi$er damper is maintained at its current position.
2. If Y1 is energized for more than 20 minutes, and Y2 is not energized (whether or not a 2-stage thermostat is used), the compressor, RVS1 and OFM are energized. The EconoMi$er damper is maintained at its current position.
3. If Y1 is energized, the compressor and RVS1 are already energized (see Step 2) and the room thermostat calls for Y2, the compressor continues to operate.
4. If compressor and RVS1 are energized and the thermostat is satisfied, the compressor, RVS1, the OFM, and IFM are deenergized and the EconoMi$er modulates closed.

When the OAT is below the MECH CLG LOCKOUT set point, the compressors remain off.

COOLING, UNITS WITH ECONOMI$ER (EconoMi$er, Johnson Actuator, was produced from Unit Serial Numbers from 2009Gxxxxx to 0702Gxxxxx) (Sizes 008-014) — When the outdoor-air temperature (OAT) is above the ECON SP set point and the room thermostat calls for Stage 1 cooling, terminals G and Y1 are energized. The indoor-fan contactor (IFC), reversing valve solenoid (RVS1) and compressor contactor no. 1 (C1) are energized and indoor-fan motor, compressor no. 1 and outdoor fans start. The EconoMi$er damper modulates to minimum position. The outdoor-fan motor(s) runs continuously while unit is cooling. After the thermostat is satisfied, the damper modulates to the fully closed position when the IFM is deenergized.

When the OAT is below the ECON SP setting and the room thermostat calls for Stage 1 cooling (R to G + Y1), the EconoMi$er modulates to the minimum position when the IFM is energized. The EconoMi$er provides Stage 1 of cooling by modulating the return and outdoor-air dampers to maintain a 55 F supply air set point. If the supply-air temperature (SAT) is greater than 57 F, the EconoMi$er modulates open, allowing a greater amount of outdoor air to enter the unit. If the SAT drops below 53 F, the outdoor air damper modulates closed to reduce the amount of outdoor air. When the SAT is between 53 and 57 F, the EconoMi$er maintains its position.

If outdoor-air alone cannot satisfy the cooling requirements of the conditioned space, and the OAT is above the MECH CLG LOCKOUT set point, the EconoMi$er integrates free cooling with mechanical cooling. This is accomplished by the strategies below.

NOTE: Compressors have a 2-minute Minimum On, Minimum Off, and Interstage delay timer.

1. If Y1 is energized, and the room thermostat calls for Y2 (2-stage thermostat), compressor no. 1, RVS1 and OFM are energized. The EconoMi$er damper is maintained at its current position.
2. If Y1 is energized for more than 20 minutes, and Y2 is not energized (whether or not a 2-stage thermostat is used), compressor no. 1, RVS1 and OFM are energized. The EconoMi$er damper is maintained at its current position.
3. If Y1 is energized, and compressor no. 1 is already energized (see Step 2) and the room thermostat calls for Y2, compressor no. 1 continues to operate. If Y2 remains energized for more than 20 minutes, compressor no. 2 and RVS2 are energized.

   NOTE: Compressor no. 2 cannot be energized unless there is a signal for Y2 from the space thermostat.
4. If compressor no. 2 is energized, and the Y2 signal from the thermostat is satisfied, compressor no. 1 and 2, RVS1, RVS2 and ODF are deenergized. Reasserting Y2 will start compressor no. 1 and (after a 20-minute interstage delay) compressor 2.
5. If compressor no. 1 is energized and the thermostat is satisfied, compressor no. 1, the OFM, RVS1 and IFM are deenergized and the EconoMi$er modulates closed.

HEATING, UNITS WITH ECONOMIZER INCLUDING DURABLADE, ECONOMI$ER (Johnson) OR ECONOMI$ER2 (Sizes 004-007) — Set system switch at AUTO. or HEAT position. Set thermostat at desired temperature.

When the thermostat calls for heat, the IFC, outdoor-fan contactor (OFC), and compressor contactor are energized. The economizer damper blade opens to minimum position. The RVS is deenergized and switches position, and the indoor fan, outdoor fan, and compressor are energized.

If the thermostat calls for a second stage of heat, the heater contactor (HC) is energized and starts the electric heaters.

When the space temperature approaches the heating temperature set point, heating stages cycle off. The reversing valve solenoid is reenergized.

HEATING, UNITS WITH ECONOMIZER INCLUDING DURABLADE, ECONOMI$ER (Johnson) OR ECONOMI$ER2 (Sizes 008-012) — Upon a request for heating from the space thermostat, terminal W1 will be energized with 24 v. The IFC, outdoor-fan contactor (OFC), C1, and C2 will be energized. The reversing valves switch position and the indoor fan, outdoor fan, compressor no. 1, and compressor no. 2 are energized. The economizer damper blade opens to minimum position.

If the space temperature continues to fall while W1 is energized, W2 will be energized with 24 v, and the heater contactor(s) (HC) will be energized, which will energize the electric heater(s).

When the space thermostat is satisfied, W2 will be deenergized first, and the electric heater(s) will be deenergized.

Upon a further rise in space temperature, W1 will be deenergized, and the reversing valve solenoids (RVS1 and RVS2) will be energized.

DEFROST (Sizes 004-007) — As frost builds up on the outdoor coil, the coil temperature drops below 28 F. When this outdoor-coil temperature drop is sensed by the defrost thermostat (DFT) and the defrost timer is at the end of a timed period (adjustable at 30, 50, or 90 minutes), the unit operates in a defrost cycle controlled by the defrost timer and thermostat. During this cycle, the reversing valve solenoid (RVS) is energized and the outdoor fan shuts off. The electric heaters (if installed) will be energized.

The unit continues to defrost until the coil temperature as measured by DFT reaches 65 F, or the duration of defrost cycle completes a 10-minute period.

At the end of the defrost cycle, the electric heaters (if installed) and the reversing valve will be deenergized, and the outdoor-fan motor will be energized. The unit will now operate in the Heating mode.

If the thermostat is satisfied during a defrost cycle, the unit will continue in the Defrost mode until the time or temperature constraints are satisfied.

DEFROST (Sizes 008-012) — When the temperature of the outdoor coil drops below 28 F as sensed by the defrost thermostat (DFT2) and the defrost timer is at the end of a timed period (adjustable at 30, 50, or 90 minutes), reversing valve solenoids (RVS1 and RVS2) are energized and the OFC is deenergized. This switches the position of the reversing valves and shuts off the outdoor fan. The electric heaters (if installed) will be energized.

The unit continues to defrost until the coil temperature as measured by DFT2 reaches 65 F, or the duration of defrost cycle completes a 10-minute period.

During the Defrost mode, if circuit 1 defrosts first, RVS1 will oscillate between Heating and Cooling modes until the Defrost mode is complete.

At the end of the defrost cycle, the electric heaters (if installed) will be deenergized; the reversing valves switch and the outdoor-fan motor will be energized. The unit will now operate in the Heating mode.

If the space thermostat is satisfied during a defrost cycle, the unit will continue in the Defrost mode until the time or temperature constraints are satisfied.

LEGEND

AHA — Adjustable Heat Anticipator
AWG — American Wire Gage
BR — Blower Relay
C — Contactor, Compressor
CAP — Capacitor
CB — Circuit Breaker
CC — Cooling Compensator
CH — Crankcase Heater
CLO — Compressor Lockout
CO_2 — Carbon Dioxide
COC — Cool Changeover Relay
COH — Heat Changeover Relay
COM — Common
COMMS — Communications
COMP — Compressor Motor
CR — Control Relay
CTD — Compressor Time Delay
D — Diode
DAT — Discharge Air Thermistor
DB — Defrost Board
DFT — Defrost Thermostat
DM — Damper Motor
DR — Defrost Relay
DX — Direct Expansion
EC — Enthalpy Control
ECON — Economizer
EFC — Exhaust Fan Contactor
EPS — Emergency Power Supply
EQUIP — Equipment
ER — Economizer Relay
FC — Fan Contactor
FPT — Freeze Protection Thermostat
FU — Fuse
GND — Ground
GVR — Gas Valve Relay
HC — Heater Contactor (Electric Heater)
HM — Humidity Relay
HPS — High-Pressure Switch
HR — Heater Relay
HTR — Heater
HV TRAN — High-Voltage Transformer
I — Ignitor
IAQ — Indoor Air Quality
IFC — Indoor-Fan Contactor
IFM — Indoor-Fan Motor
IFMOVL — Indoor-Fan Motor Overload Switch
IFR — Indoor-Fan Relay
IGC — Integrated Gas Controller
LED — Light Emitting Diode
LPS — Low-Pressure/Loss-of-Charge Switch
LSM — Limit Switch (Manual Reset)
LTLO — Low Temp Cooling Lockout
MCA — Minimum Circuit Amps
MGV — Main Gas Valve
MTR — Motor
NC — Normally Closed
NEC — National Electrical Code
NO — Normally Open
OAT — Outdoor-Air Thermostat
OATC — Outdoor Air Thermostat (Cool)
OATH — Outdoor Air Thermostat (Heat)
OCR — Occupied Relay
OFC — Outdoor-Fan Contactor
OFM — Outdoor-Fan Motor
OLR — Overload Relay
P, PL — Plug
QT — Quadruple Terminal
R — Relay
RVS — Reversing Valve Solenoid
SAT — Supply-Air Thermostat
SW — Switch
SW1 — Switch, Fully Open
SW2 — Switch, Fully Closed
SW3 — Switch Minimum Vent Position
SW4 — Switch Maximum Vent Position
TB — Terminal Block
TC — Thermostat, Cooling
TDR — Time-Delay Relay
TH — Thermostat, Heating
TRAN — Transformer
VVT® — Variable Volume/Variable Temperature


Field Splice

Terminal (Marked)

Marked Wire


Terminal (Unmarked)

Terminal Block


Splice


Splice Marked

Factory Wiring

Field Control Wiring

Field Power Wiring

Accessory or Optional Wiring


To indicate common potential only.
Not to represent wiring.

NOTES FOR FIG. 1

1. If any of the original wire furnished must be replaced, it must be replaced with Type 90 C wire or its equivalent.
2. Thermostat:
   HH07AT170, 172, 174, and P272-2783.
   Subbase:
   HH93AZ176, 178 and P272-1882, 1883.
3. Set heat anticipator at .8 amp for 1st stage and .3 amp for 2nd stage.
4. Use copper conductors only.
5. Use copper, copper-clad aluminum or aluminum conductors.
6.

VOLTAGE RATING	CB MFG. PT. NO.	MUST TRIP AMPS
24 V	Potter & Brumfield W2BX-1024-3.2	3.2

NOTES FOR FIG. 2, 8, 11, 12, 13

1. If any of the original wire furnished must be replaced, it must be replaced with Type 90 C wire or its equivalent.
2. Three-phase motors are protected under primary single phasing conditions.
3. Thermostat:
   HH07AT170, 172, 174, and P272-2783.
   Subbase:
   HH93AZ176, 178, and P272-1882, 1883.
4. Set heat anticipator at .8 amp for 1st stage and .3 amp for 2nd stage.
5. Use copper conductors only.
6. Use copper, copper-clad aluminum or aluminum conductors.
7.

VOLTAGE RATING	CB MFG. PT. NO.	MUST TRIP AMPS
24 V	Potter & Brumfield W2BX-1024-3.2	3.2

NOTES FOR FIG. 3, 4, 6, 7, 9, 10

1. If any of the original wire furnished must be replaced, it must be replaced with Type 90 C wire or its equivalent.
2. Thermostat:
   HH07AT170, 172, 174, and P272-2783
   Subbase:
   HH93AZ176, 178, and P272-1882, 1883.
3. Three-phase motors are protected under primary single-phasing conditions.
4. Set heat anticipator at .8 amp for 1st stage and .3 amp for 2nd stage.
5. Use copper conductors only.
6.

VOLTAGE RATING	CB MFG. PT. NO.	MUST TRIP AMPS
24 V	Potter & Brumfield W2BX-1024-3.2	3.2

NOTES FOR FIG. 5

1. If any of the original wire furnished must be replaced, it must be replaced with Type 90 C wire or its equivalent.
2. Thermostat:
   HH07AT170, 172, 174, and P272-2783
   Subbase:
   HH93AZ176, 178, and P272-1882, 1883.
3. Three-phase motors are protected under primary single-phasing conditions.
4. Set heat anticipator at .8 amp for 1st stage and .3 amp for 2nd stage.
5. Use copper conductors only.
6. Use copper, copper-clad aluminum or aluminum conductors.
7.

VOLTAGE RATING	CB MFG. PT. NO.	MUST TRIP AMPS
24 V	Potter & Brumfield W2BX-1024-3.2	3.2

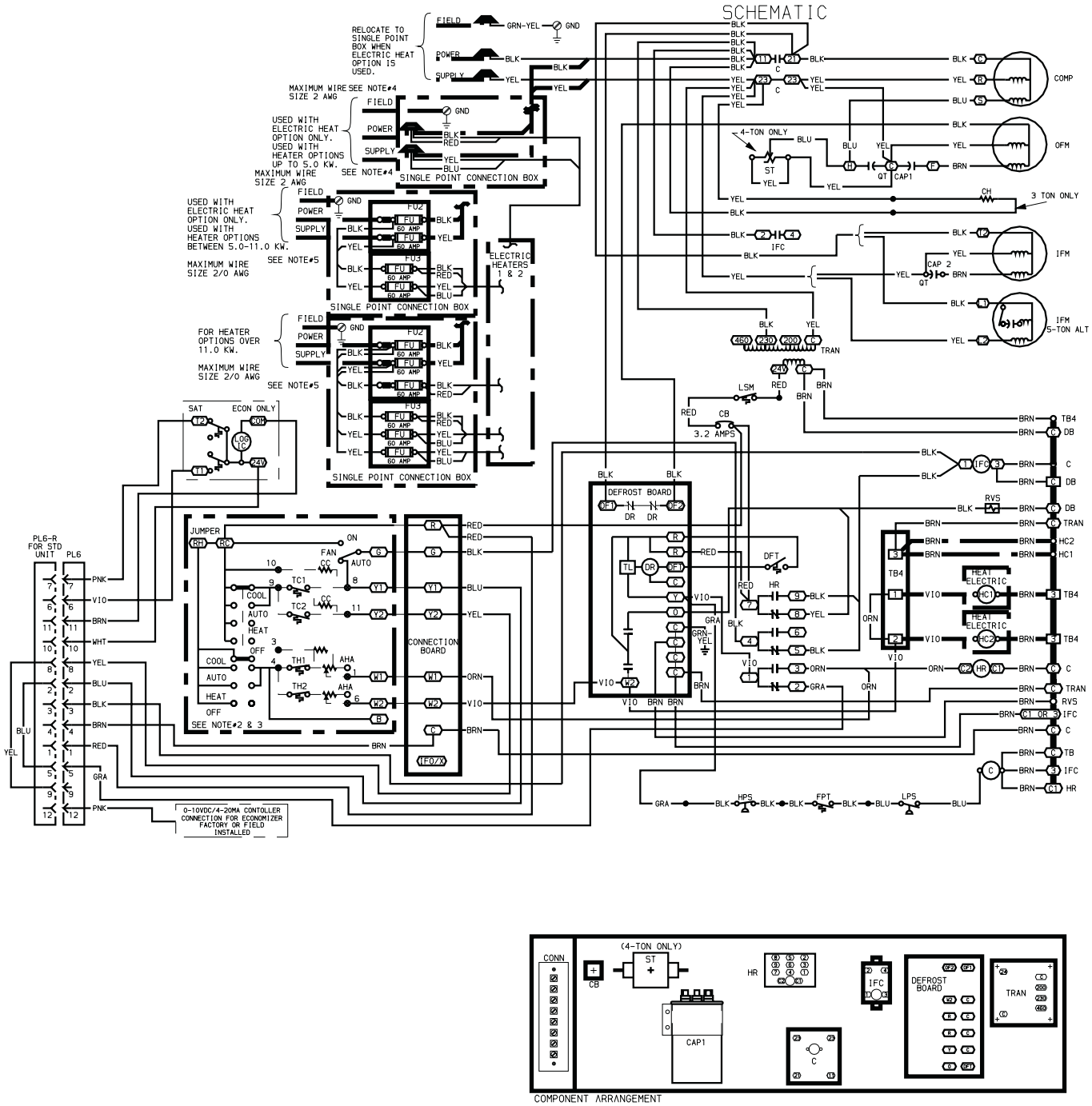


Fig. 1 — Schematic/Component Arrangement; 50TFQ004-006; 208/230-1-60

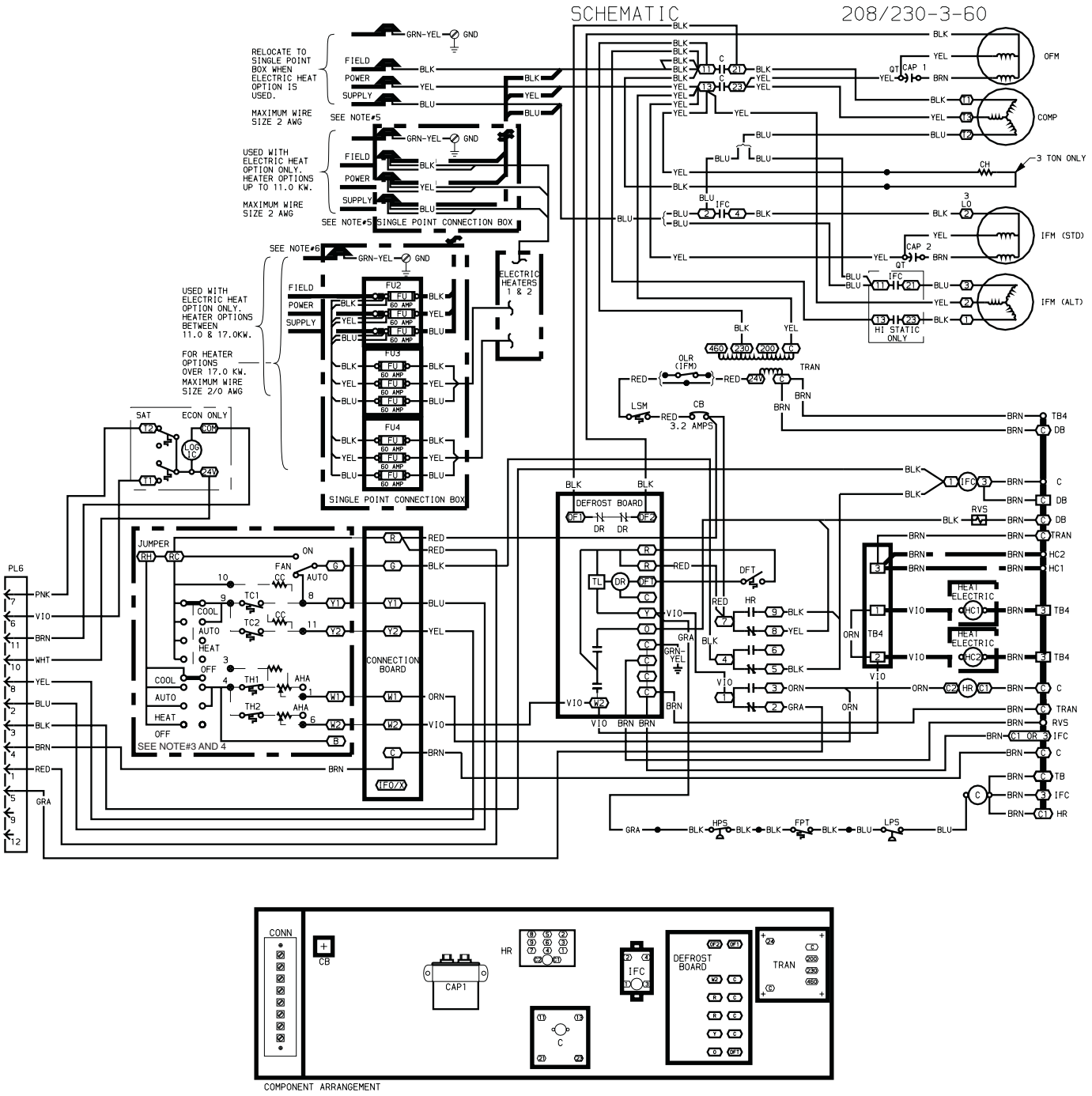


Fig. 2 — Schematic/Component Arrangement; 50TFQ004,005; 208/230-3-60

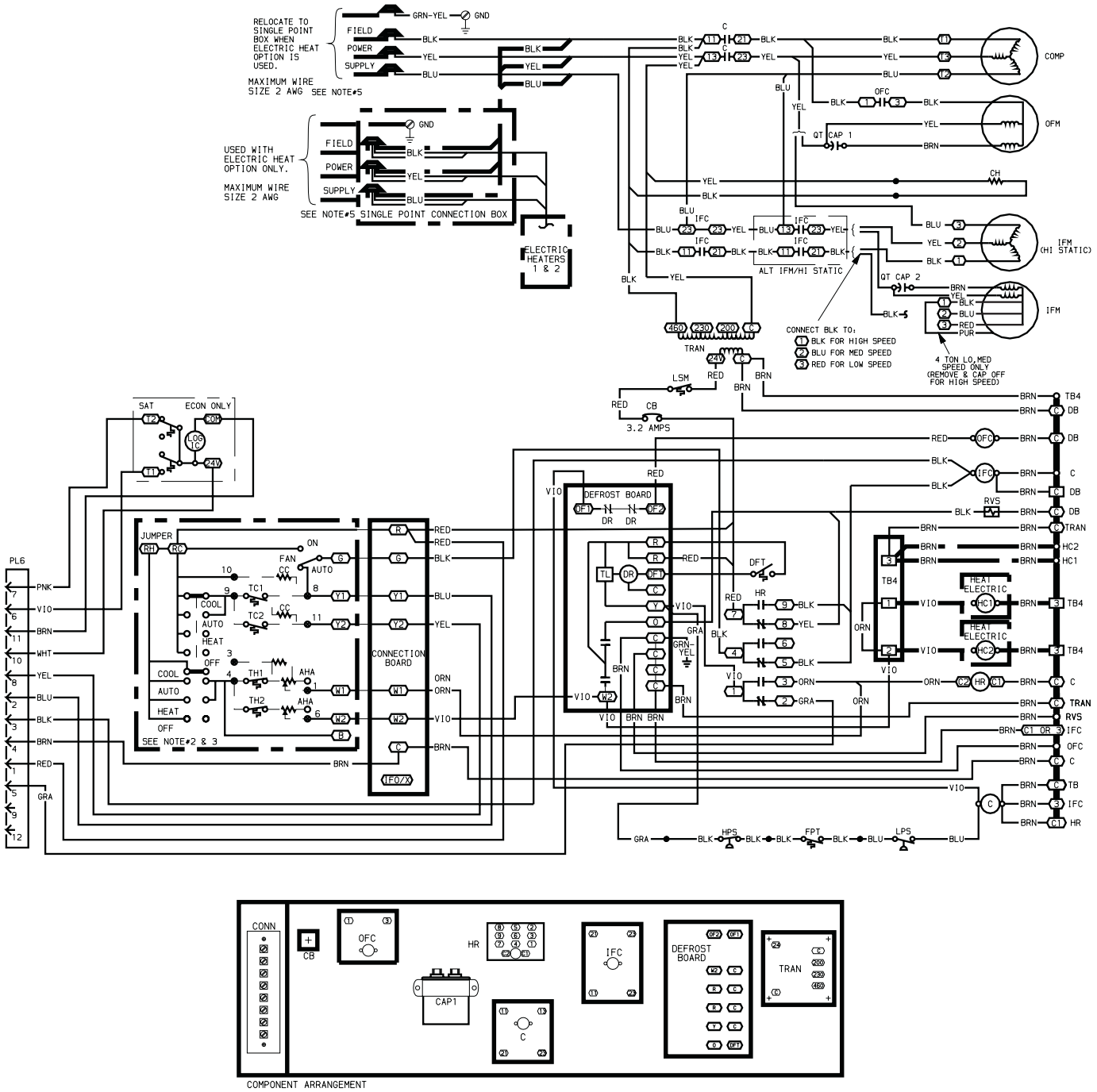


Fig. 3 — Schematic/Component Arrangement; 50TFQ004,005; 460-3-60

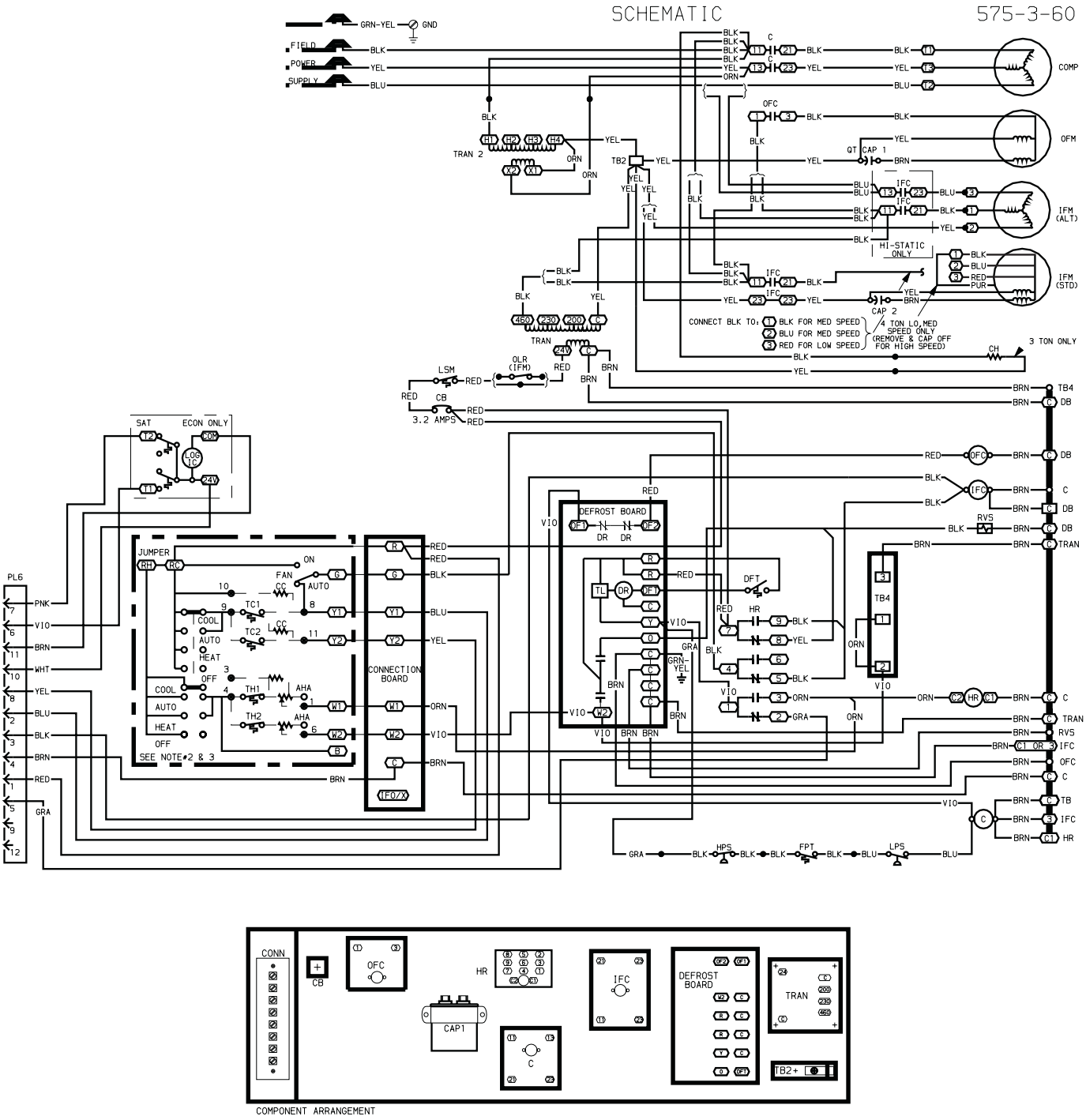


Fig. 4 — Schematic/Component Arrangement; 50TFQ004,005; 575-3-60

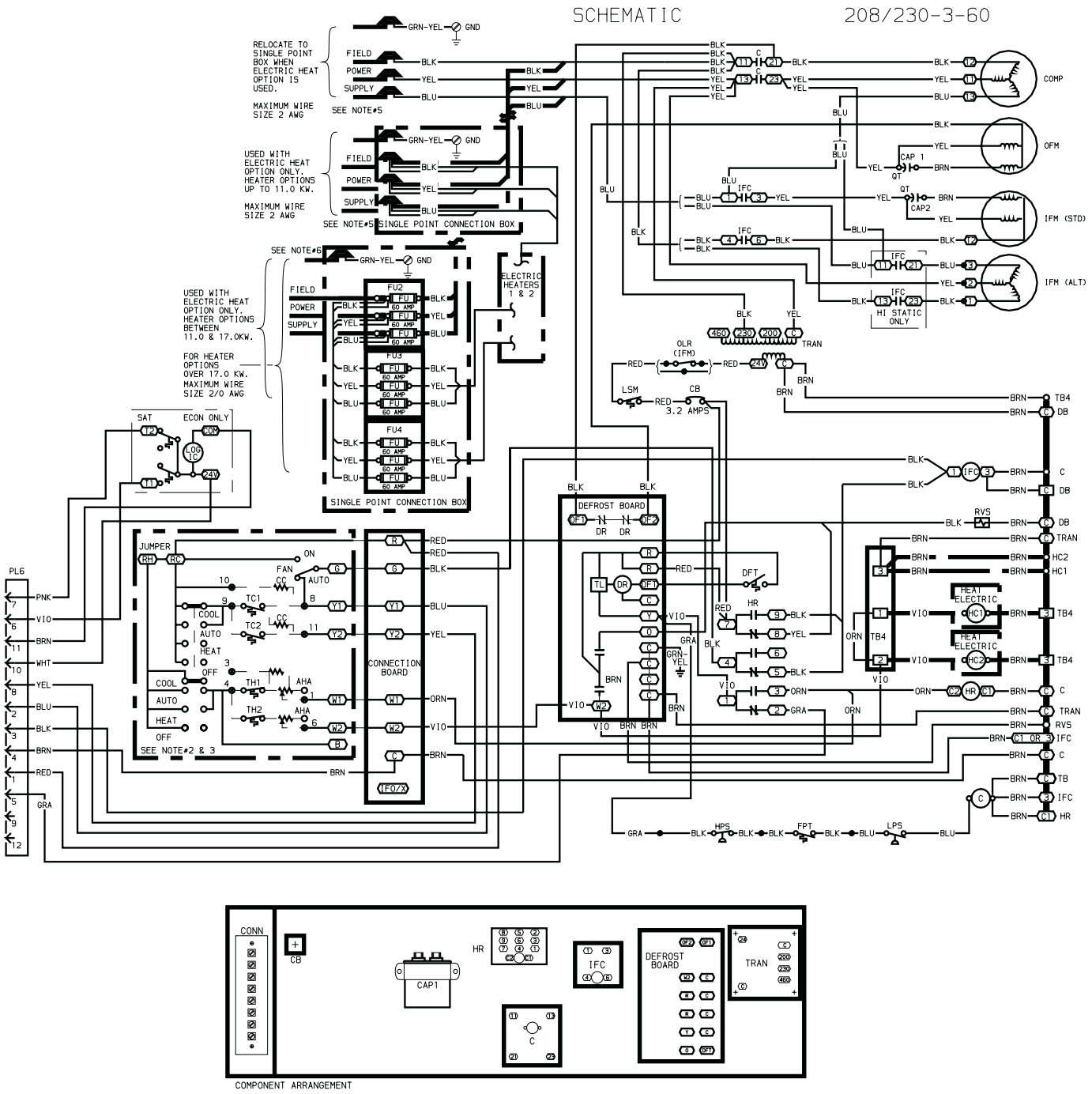


Fig. 5 — Schematic/Component Arrangement; 50TFQ006; 208/230-3-60

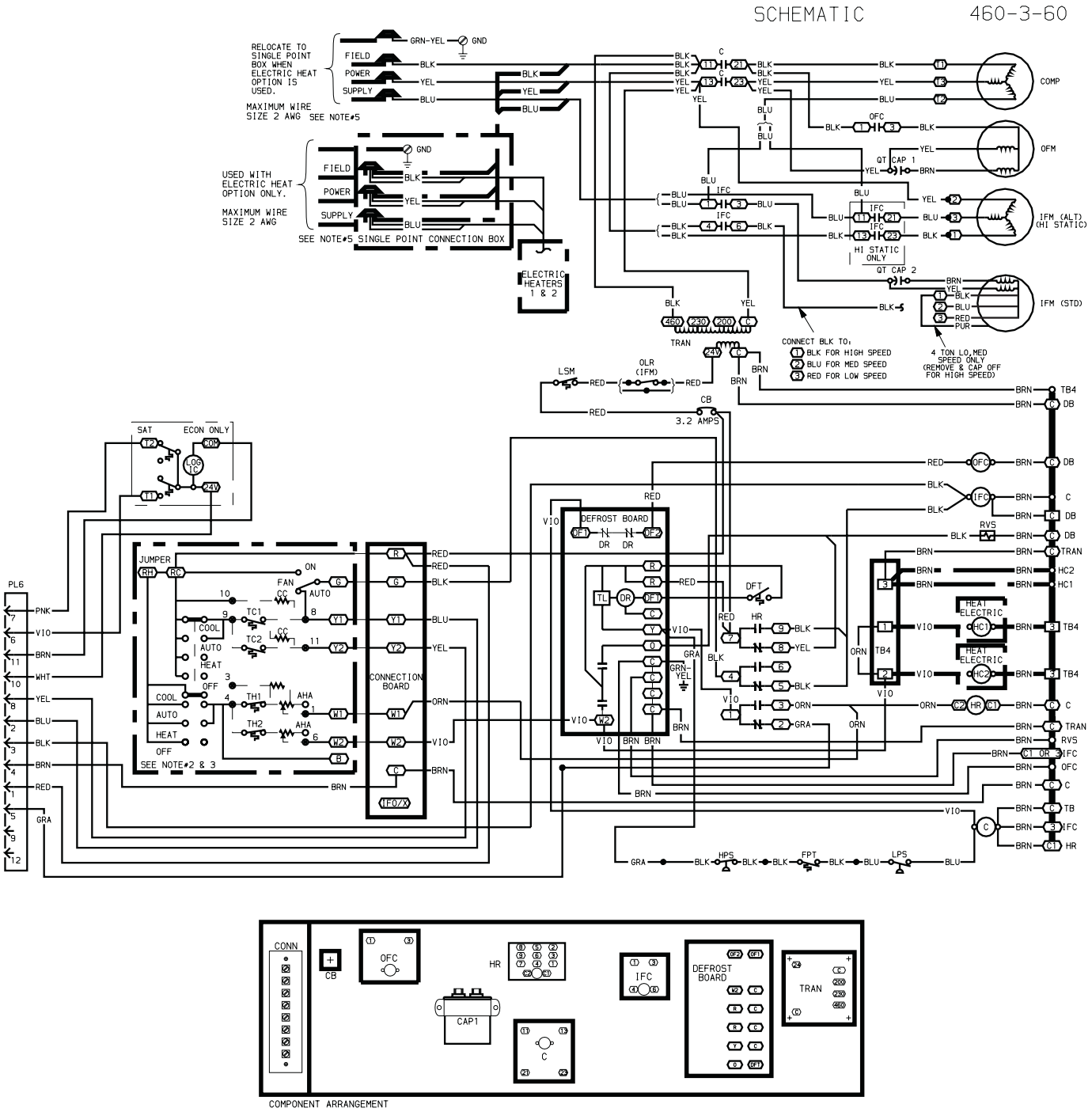


Fig. 6 — Schematic/Component Arrangement; 50TFQ006; 460-3-60

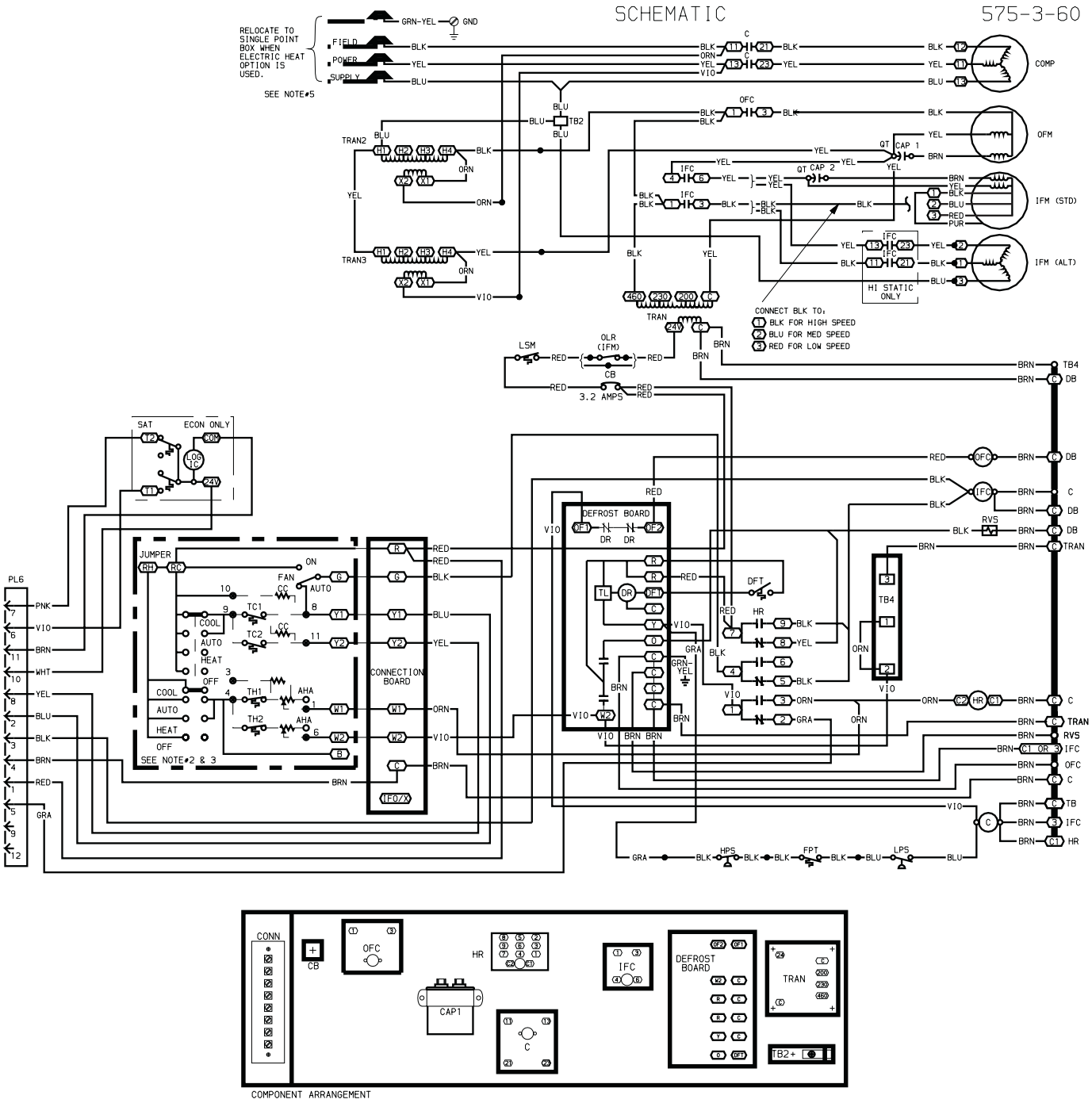


Fig. 7 — Schematic/Component Arrangement; 50TFQ006; 575-3-60

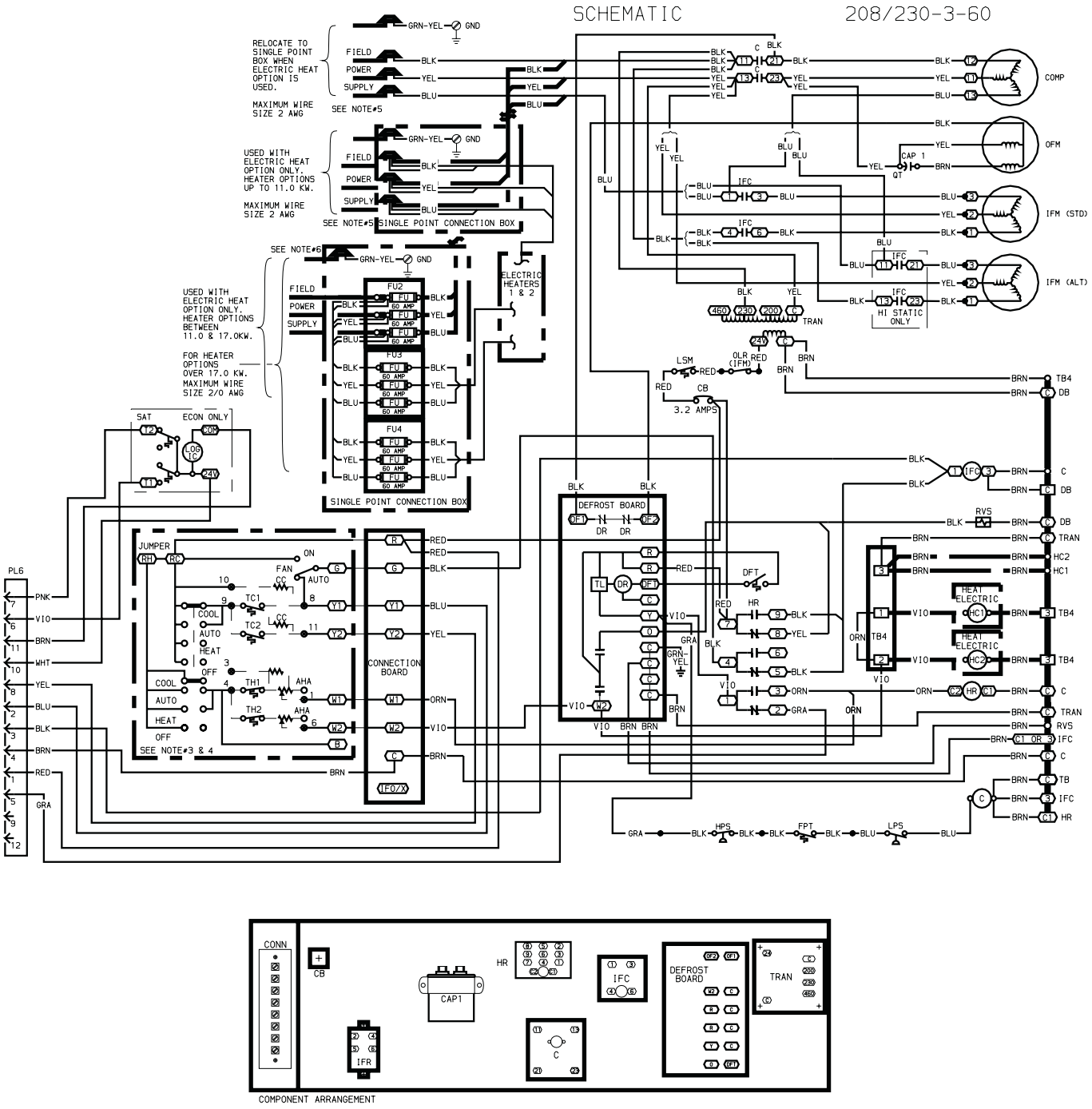


Fig. 8 — Schematic/Component Arrangement; 50TFQ007; 208/230-3-60

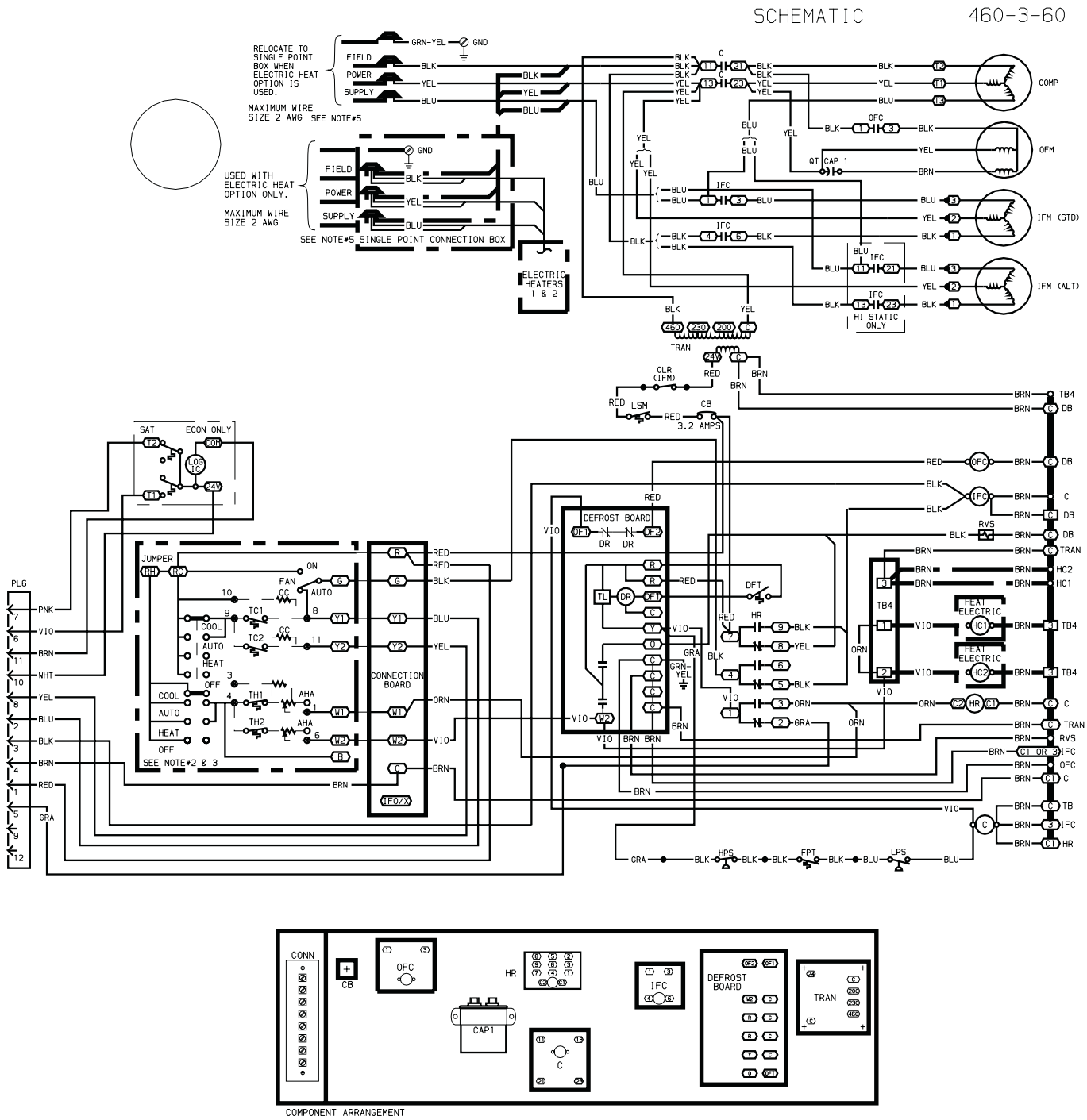


Fig. 9 — Schematic/Component Arrangement; 50TFQ007; 460-3-60

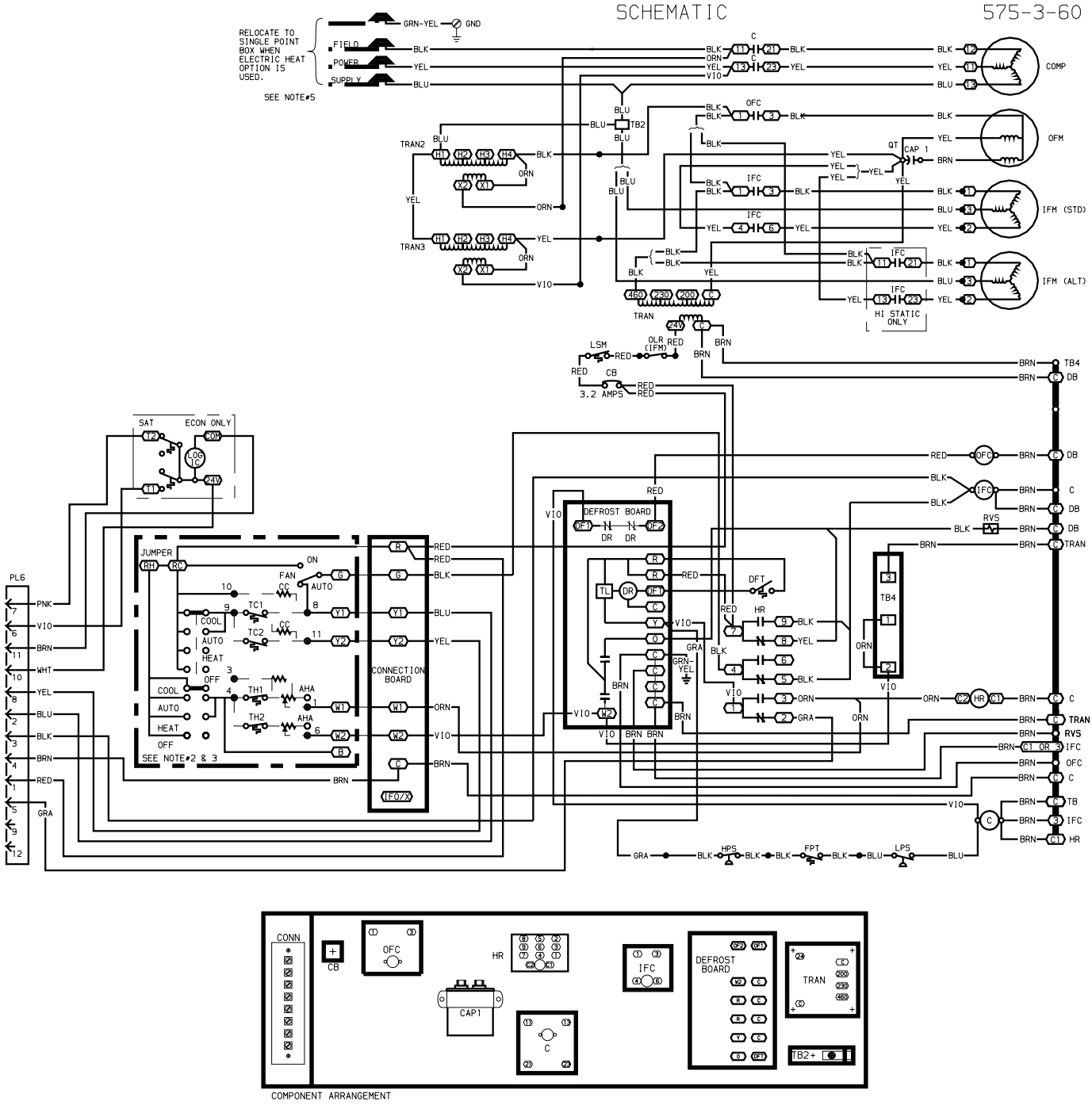


Fig. 10 — Schematic/Component Arrangement; 50TFQ007; 575-3-60

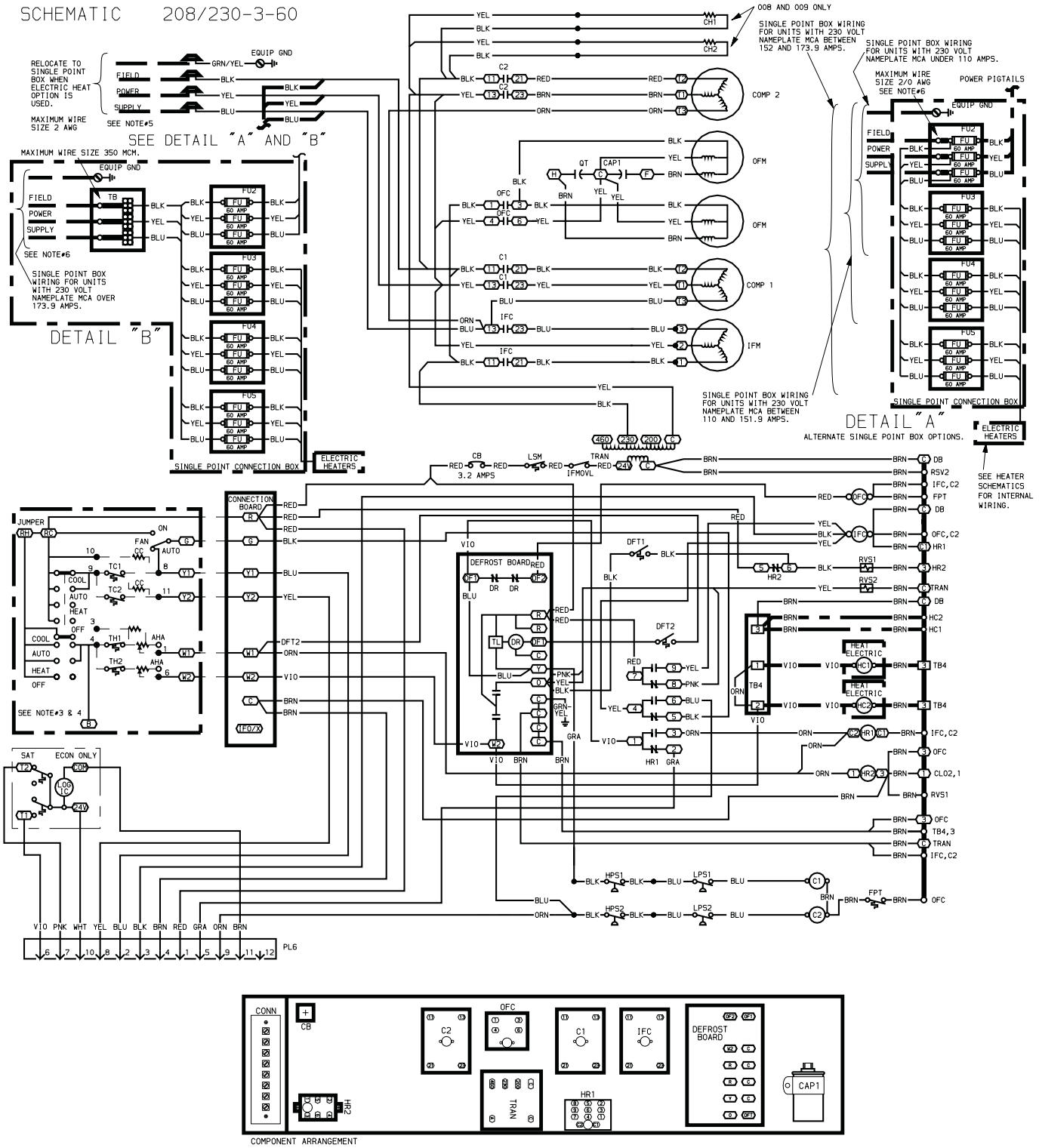


Fig. 11 — Schematic/Component Arrangement; 50TFQ008-012; 208/230-3-60

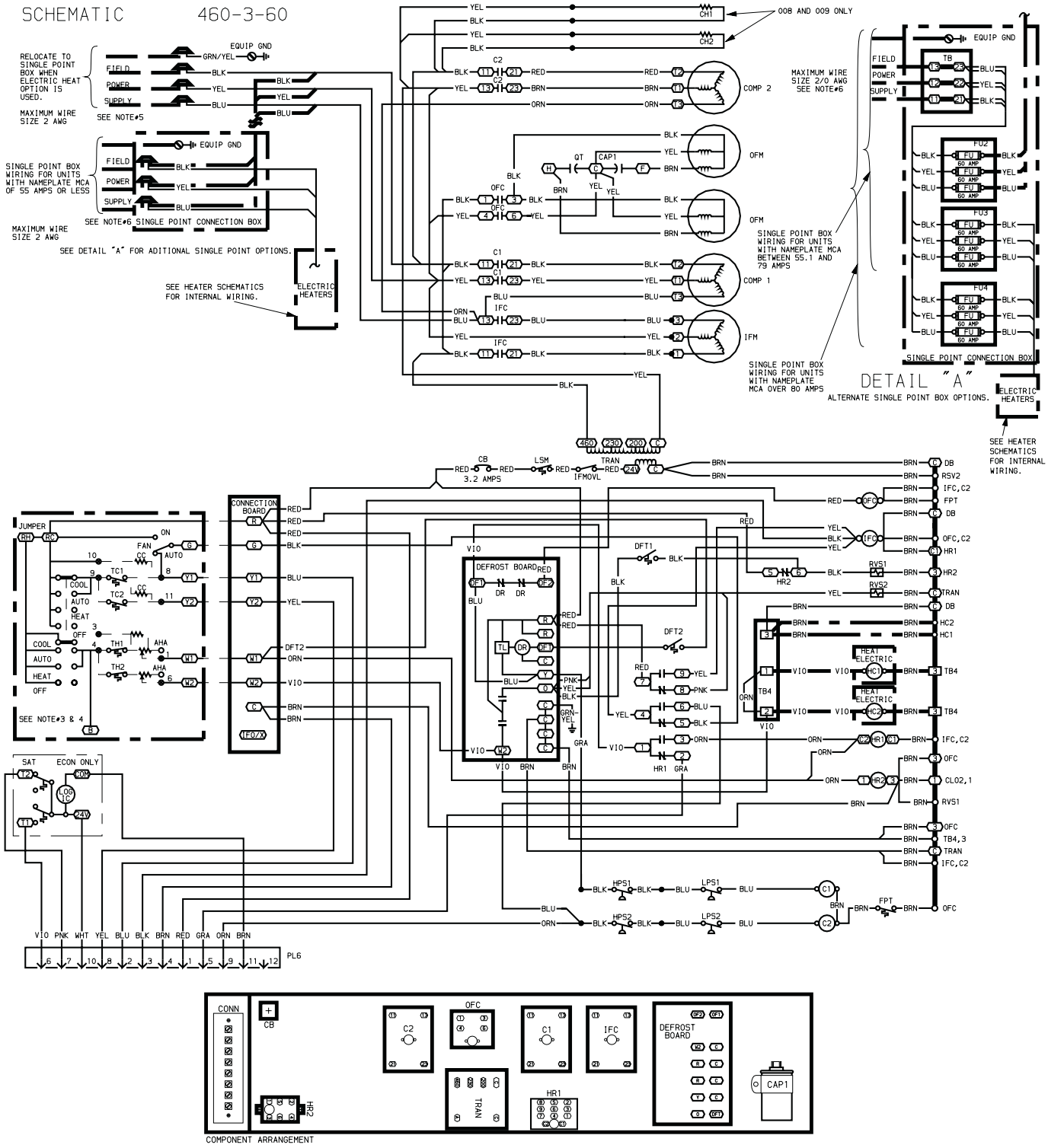


Fig. 12 — Schematic/Component Arrangement; 50TFQ008-012; 460-3-60

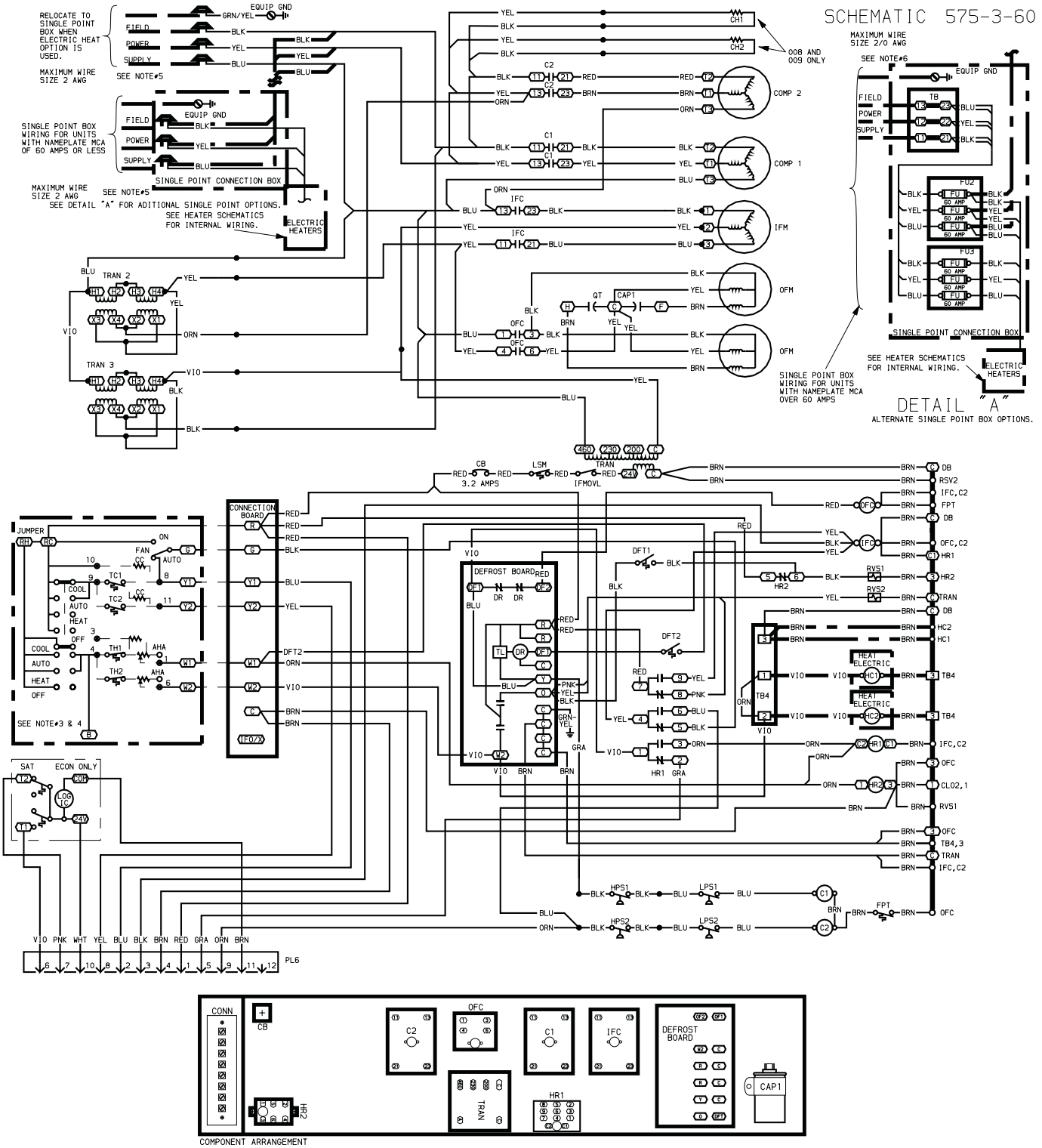
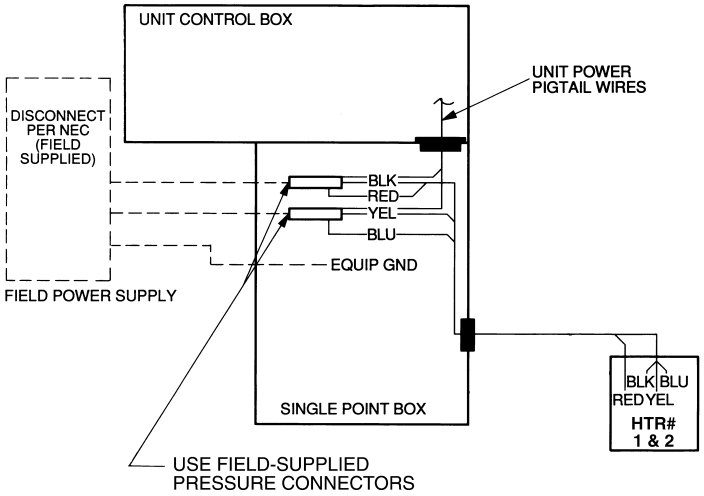
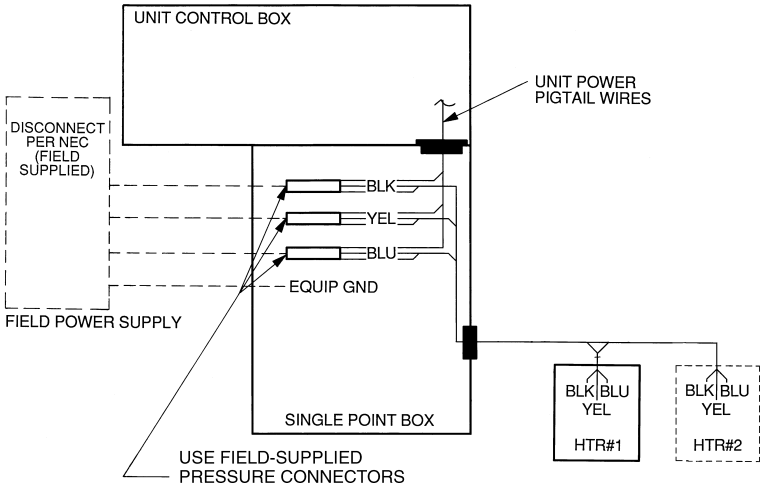


Fig. 13 — Schematic/Component Arrangement; 50TFQ008-012; 575-3-60



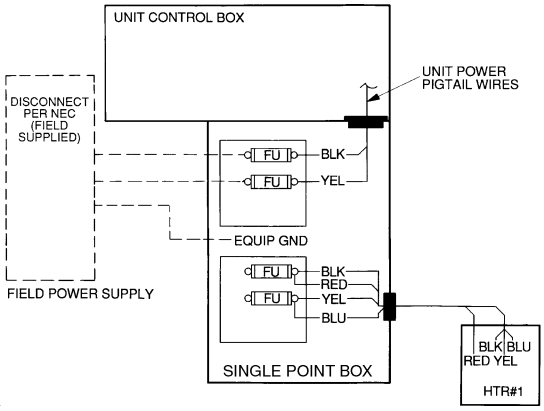
NO SINGLE POINT BOX REQUIRED OR CRSINGLE001A00

Fig. 14 — Electric Heater Power Wiring Connections
Electric Cooling Units — 208/230-1-60 — Less Than 60 Amps MOCP

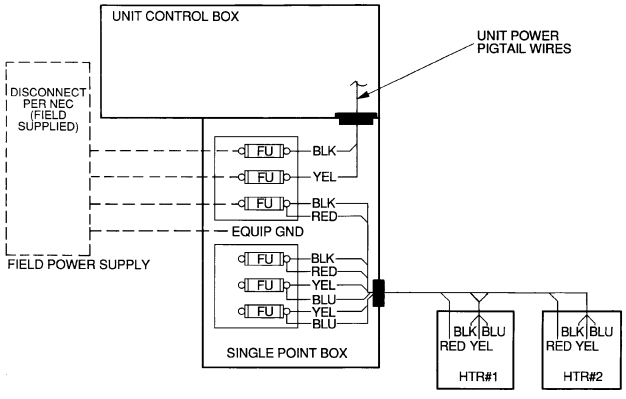


NO SINGLE POINT BOX REQUIRED (Use Existing Space in Unit) OR
CRSINGLE001A00 (Sizes 3 to 6 Tons) OR
CRSINGLE006A00 (Sizes $7^1/_2$ and $8^1/_2$ Tons) OR
CRSINGLE011A00 (Size 10 Tons)

Fig. 15 — Electric Heater Power Wiring Connections
Electric Cooling Units — 208/230-3-60, 460-3-60 — Less Than 60 Amps MOCP

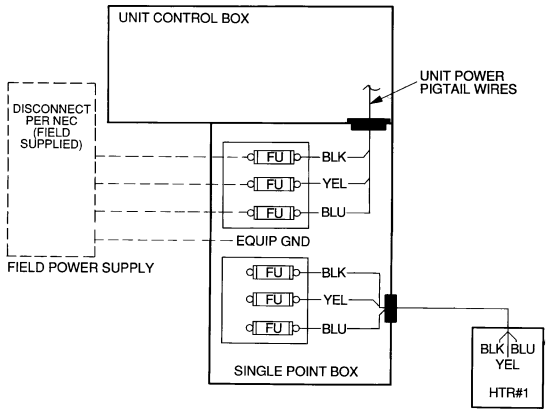


CRSINGLE004A00

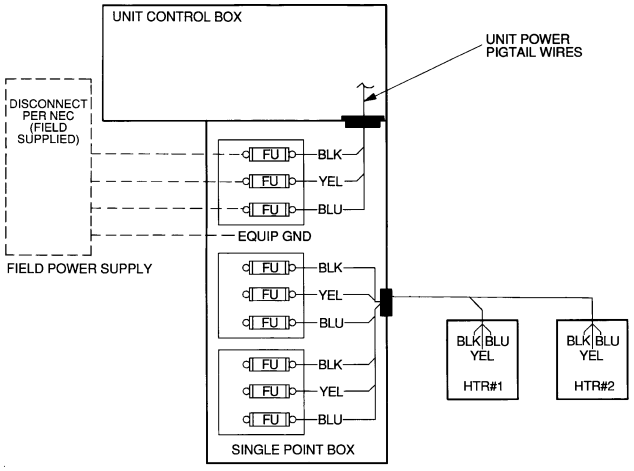


CRSINGLE005A00

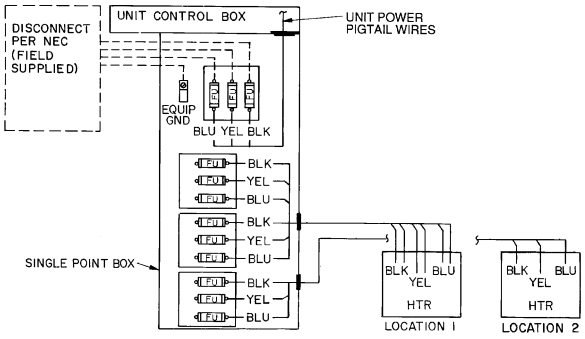
Fig. 16 — Electric Heater Power Wiring Connections —
Heat Pump Units, 208/230-1-60 — Greater Than 60 Amps MOCP



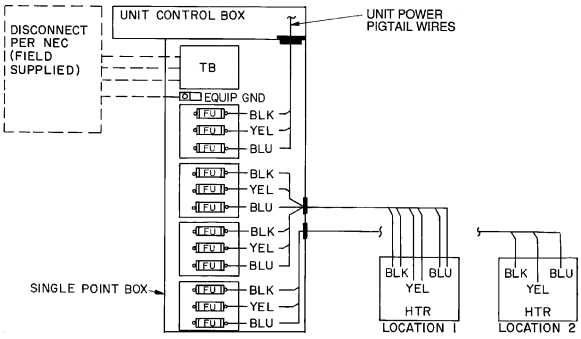
CRSINGLE002A00 OR
CRSINGLE007A00 OR
CRSINGLE012A00



CRSINGLE003A00 OR
CRSINGLE009A00 OR
CRSINGLE015A00

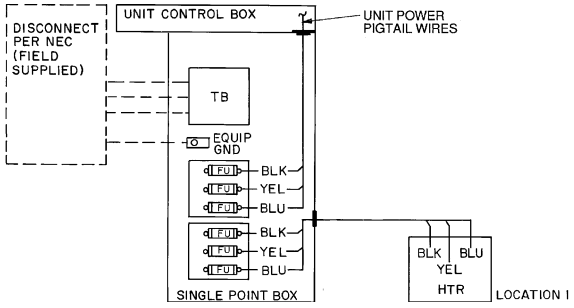


CRSINGLE013A00

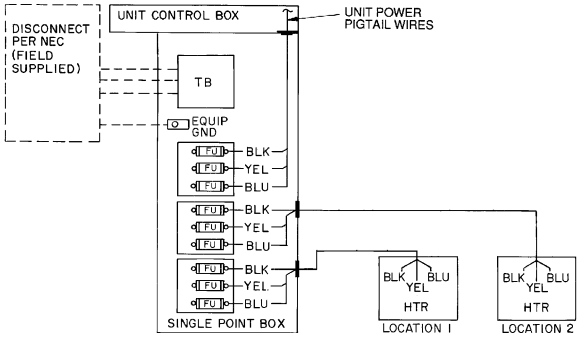


CRSINGLE017A00

**Fig. 17 — Electric Heater Power Wiring Connections —
Heat Pump Units, 208/230-3-60 — Greater Than 60 Amps MOCP**

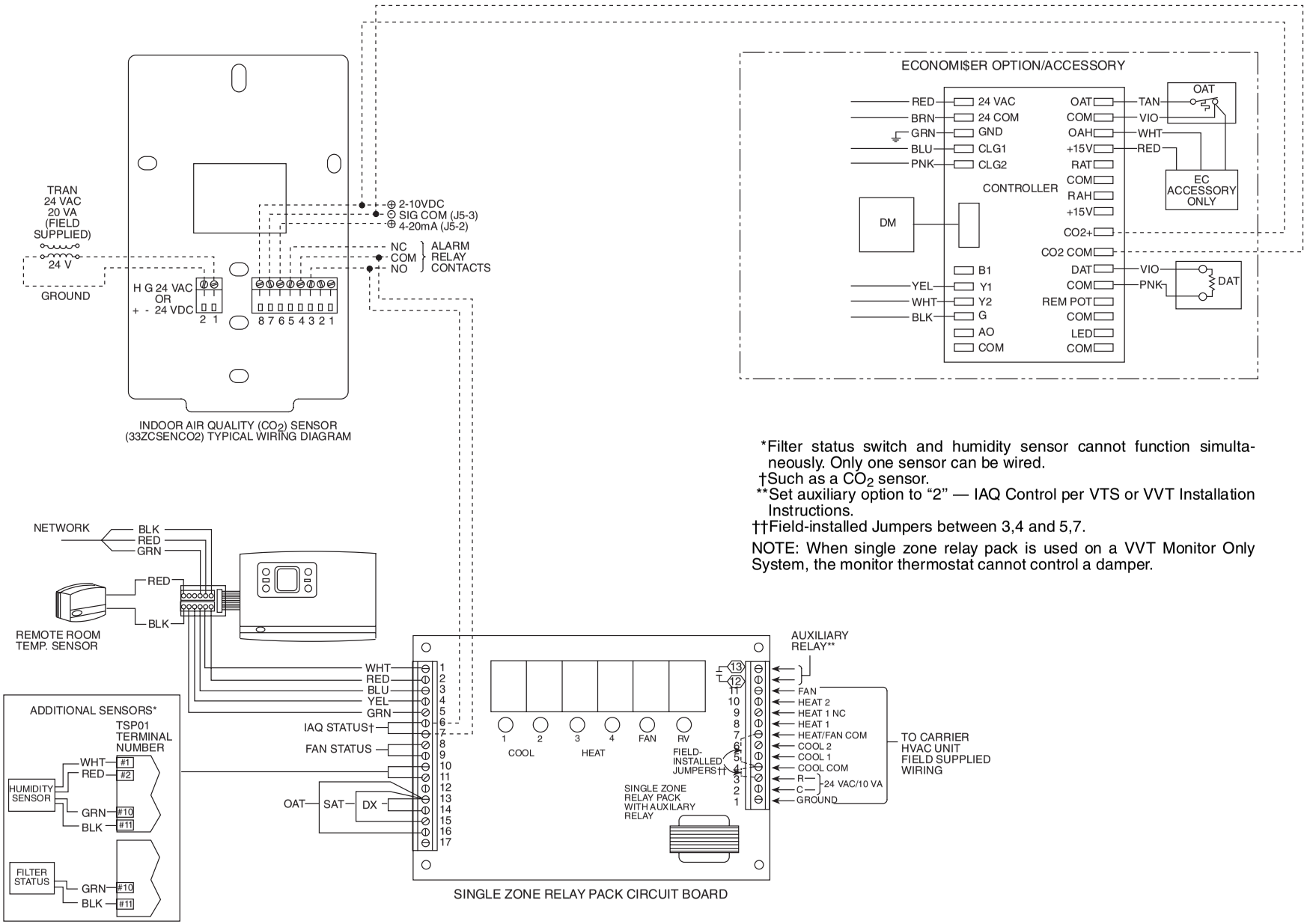


CRSINGLE008A00 AND
CRSINGLE014A00



CRSINGLE010A00 AND
CRSINGLE016A00

**Fig. 18 — Electric Heater Power Wiring Connections —
Heat Pump Units, 460-3-60 and 575-3-60 — Greater Than 60 Amps MOCP**



*Filter status switch and humidity sensor cannot function simultaneously. Only one sensor can be wired.
†Such as a CO_2 sensor.
**Set auxiliary option to "2" — IAQ Control per VTS or VVT Installation Instructions.
††Field-installed Jumpers between 3,4 and 5,7.
NOTE: When single zone relay pack is used on a VVT Monitor Only System, the monitor thermostat cannot control a damper.

Fig. 19 — Apollo Controls Wiring — Including Indoor-Air Quality

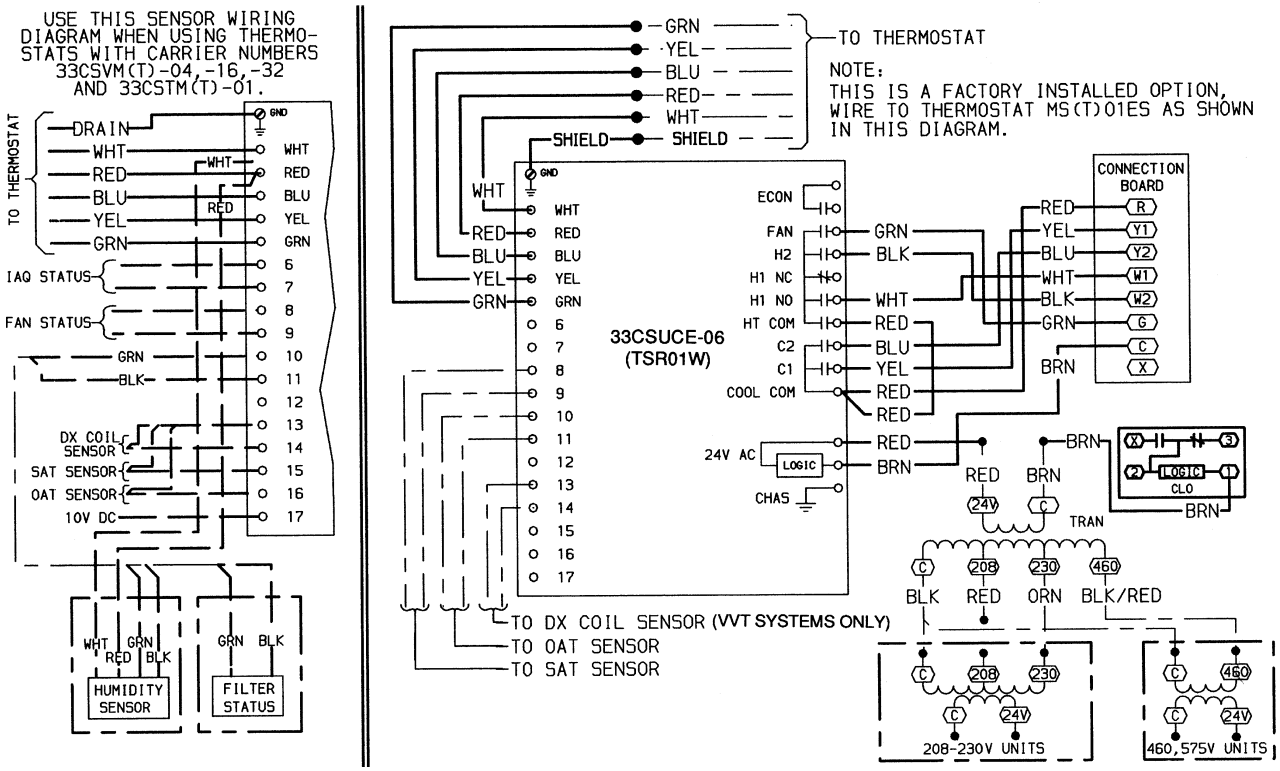


Fig. 20 — Apollo Thermostat Wiring — 50TFQ004-007 (Typical)

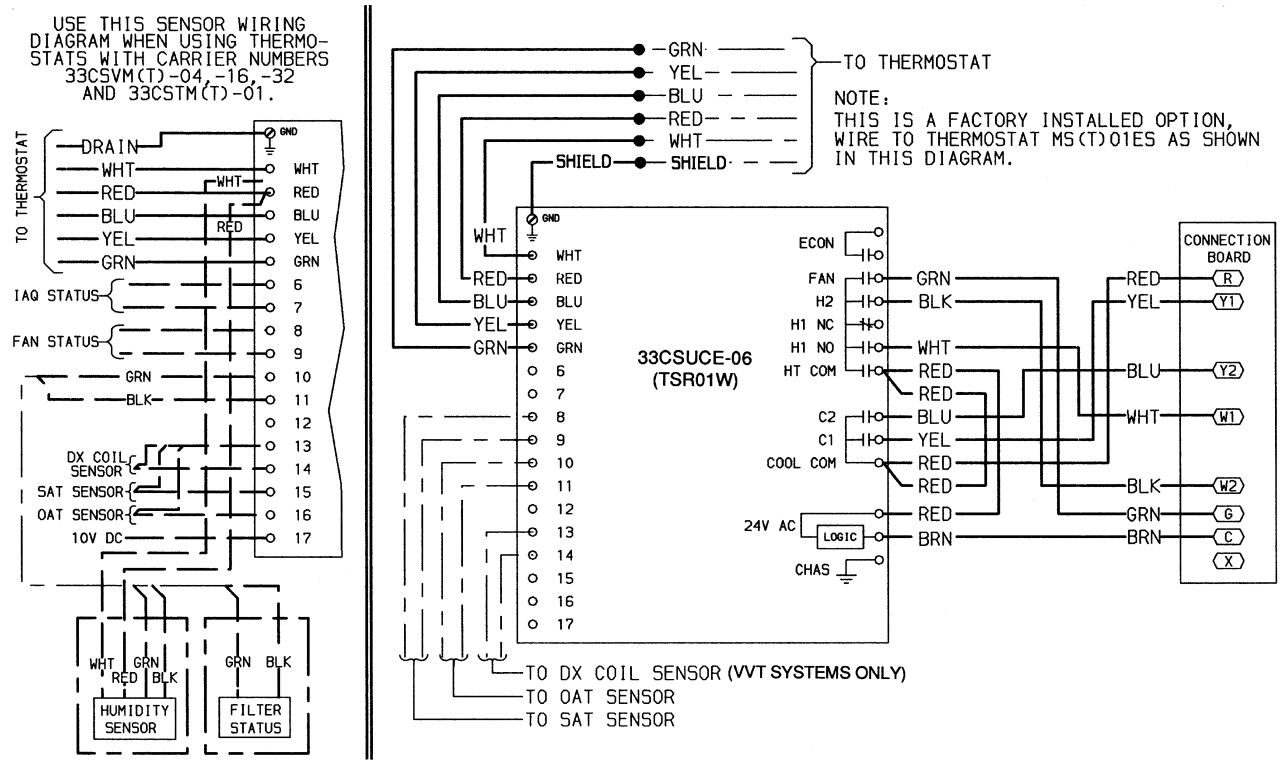


Fig. 21 — Apollo Thermostat Wiring — 50TFQ008-012 (Typical)

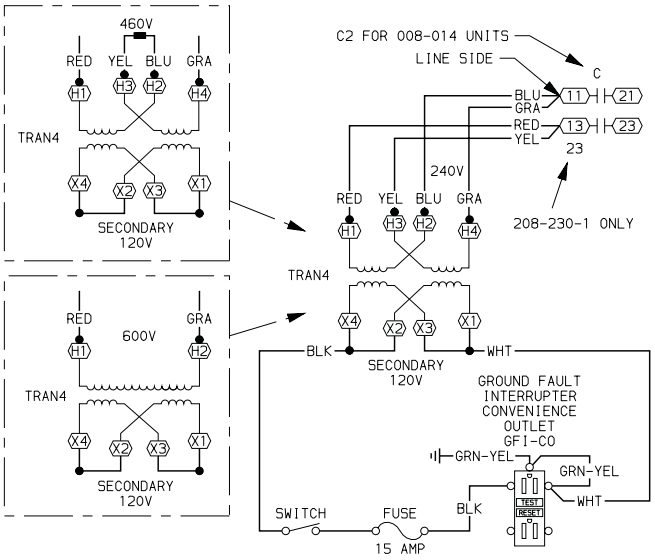


Fig. 22 — Convenience Outlet Schematic

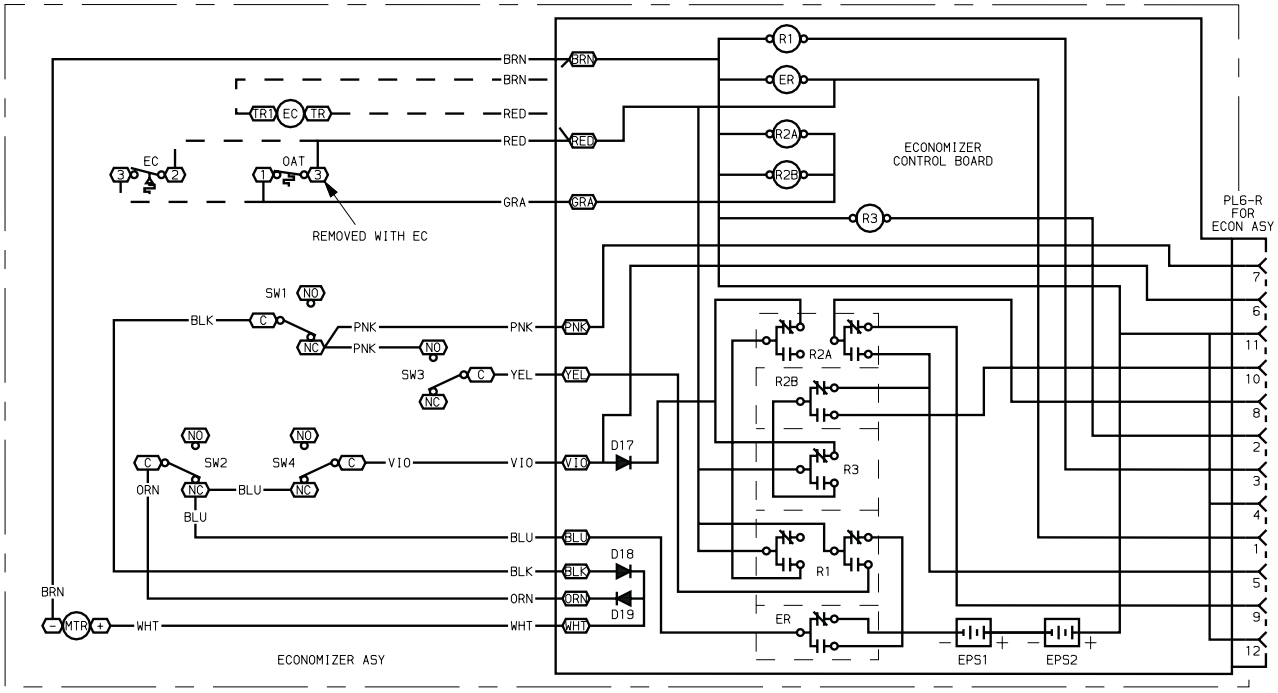
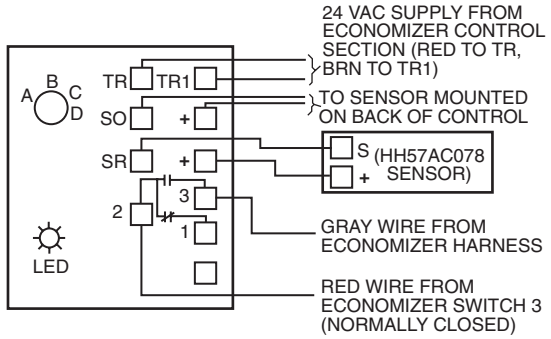


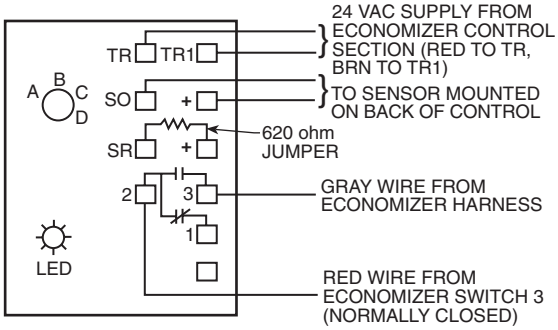
Fig. 23 — Durablade Economizer Schematic



NOTES:

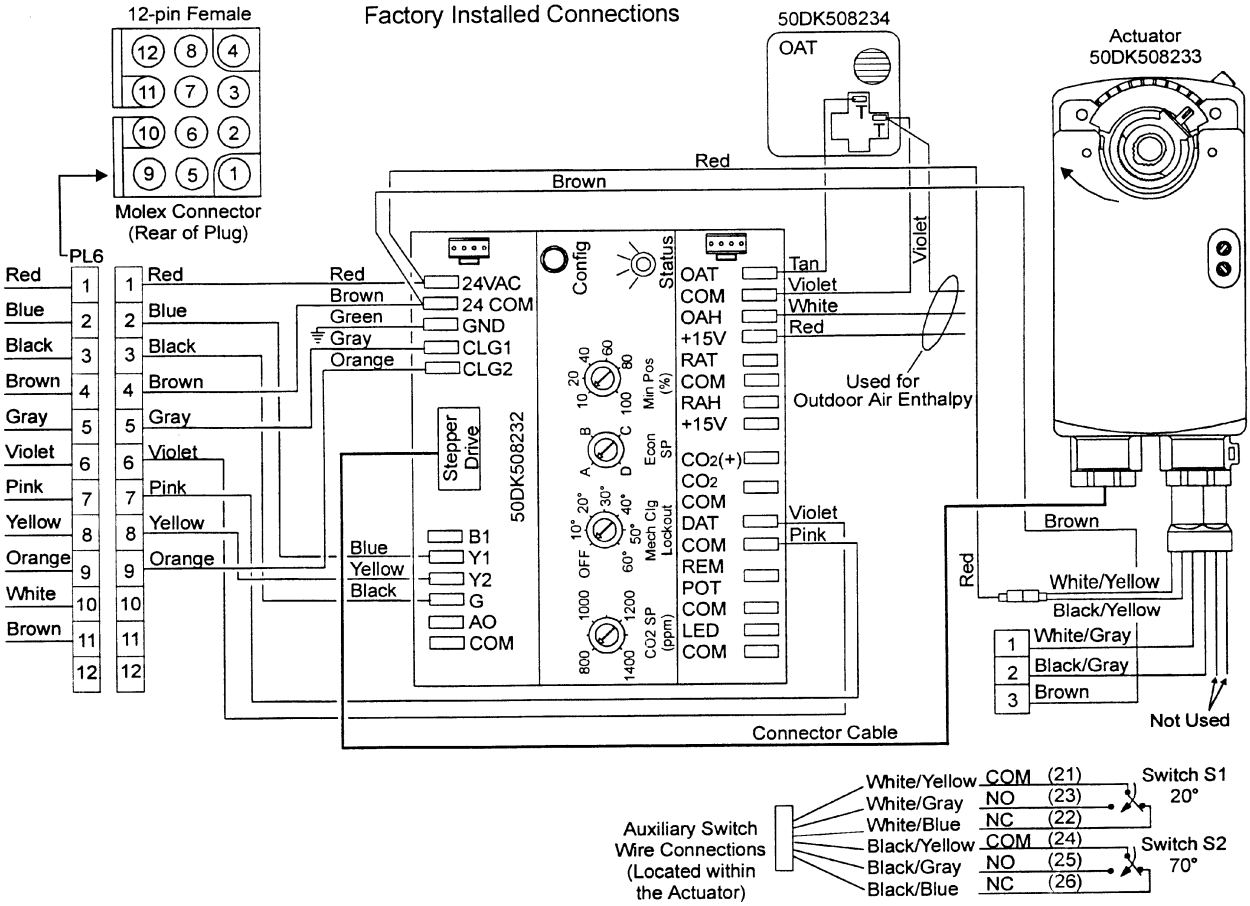
1. Remove factory-installed jumper across SR and + before connecting wires from HH57AC078 sensor.
2. Switches shown in high outdoor-air enthalpy state. Terminals 2 and 3 close on low outdoor air enthalpy relative to indoor air enthalpy.

Fig. 24 — Wiring Connections for Differential Enthalpy Control (Durablade Economizer)



NOTE: Switches shown in the high enthalpy state. Terminals 2 and 3 close on enthalpy decrease.

Fig. 25 — Wiring Connections for Solid-State Enthalpy Control (Durablade Economizer)



*Wiring is generic for all EconoMi$ers with the exception of the actuator. Refer to Fig. 29 and 30 for specific actuator production dates.

Fig. 26 — EconoMi$er Wiring for Units Produced 5/1999 through 2/2002*

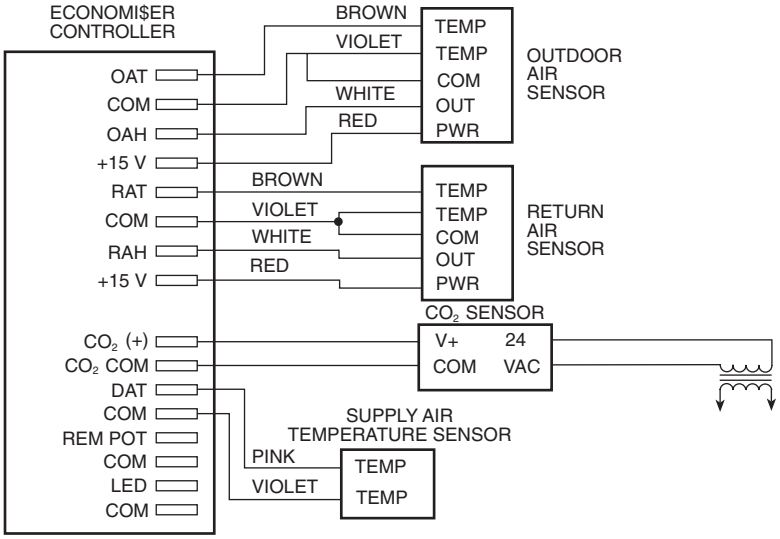


Fig. 27 — EconoMi$er Dry Bulb Sensor Wiring

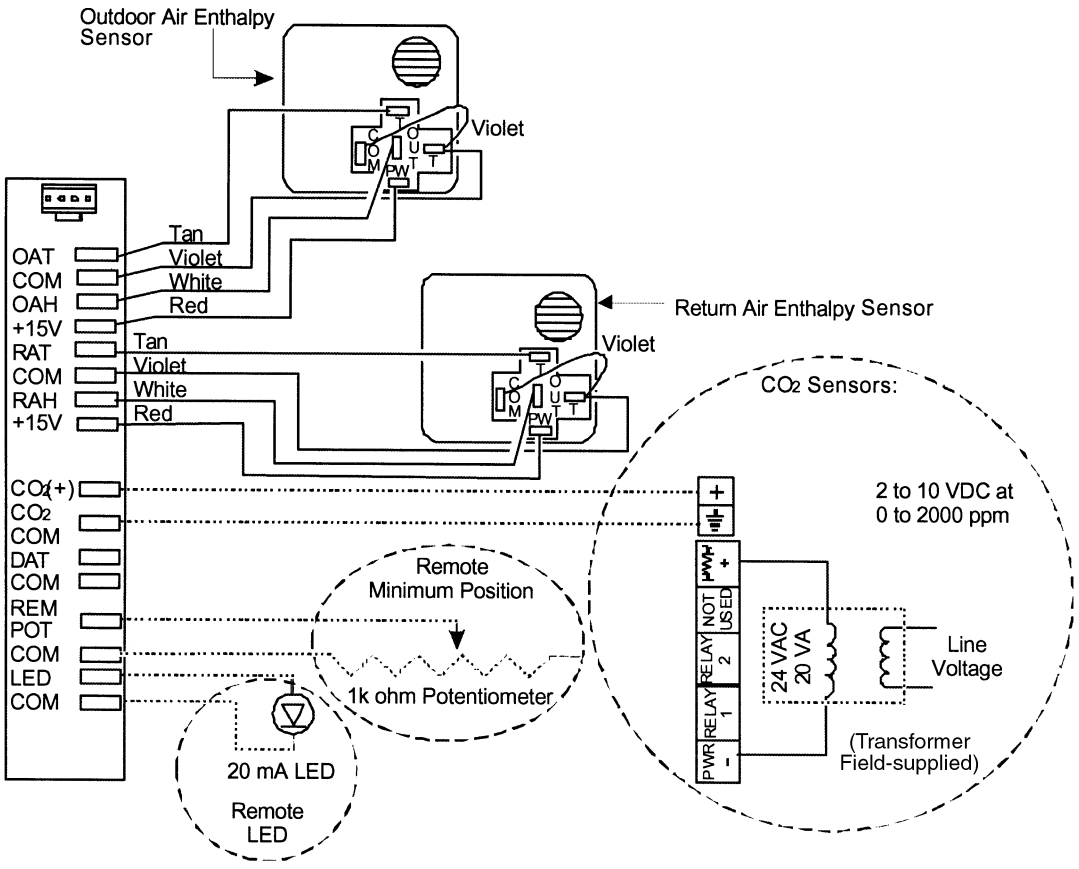


Fig. 28 — Wiring Diagram for Field-Installed Enthalpy Sensors

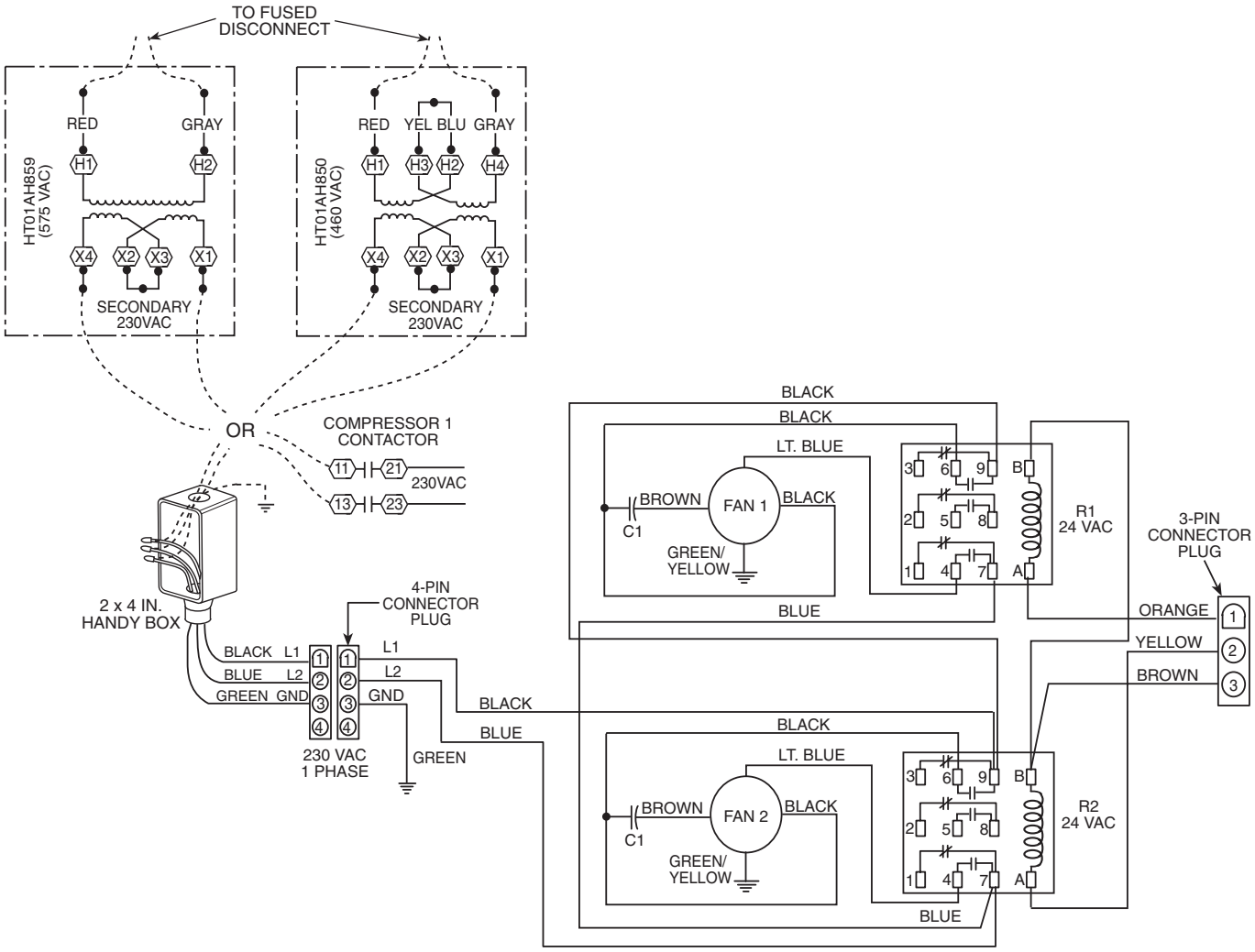


Fig. 29 — EconoMi$er Power Exhaust with the Switch Inside the Actuator (Units Produced 5/16/1999 - 11/5/2001)

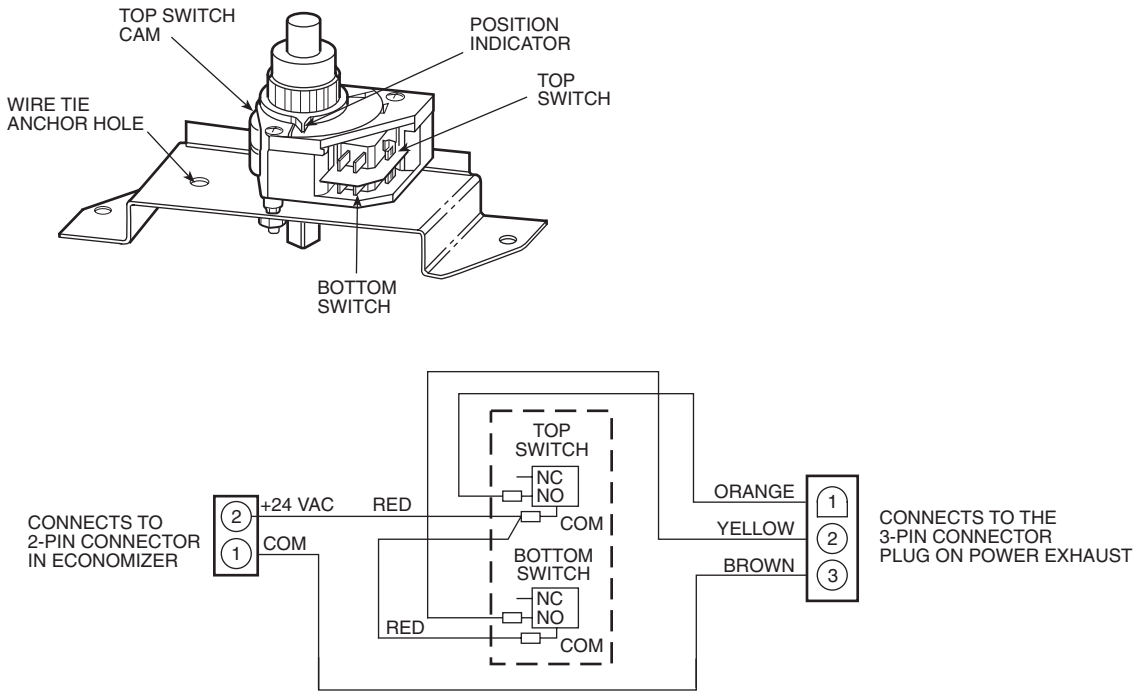
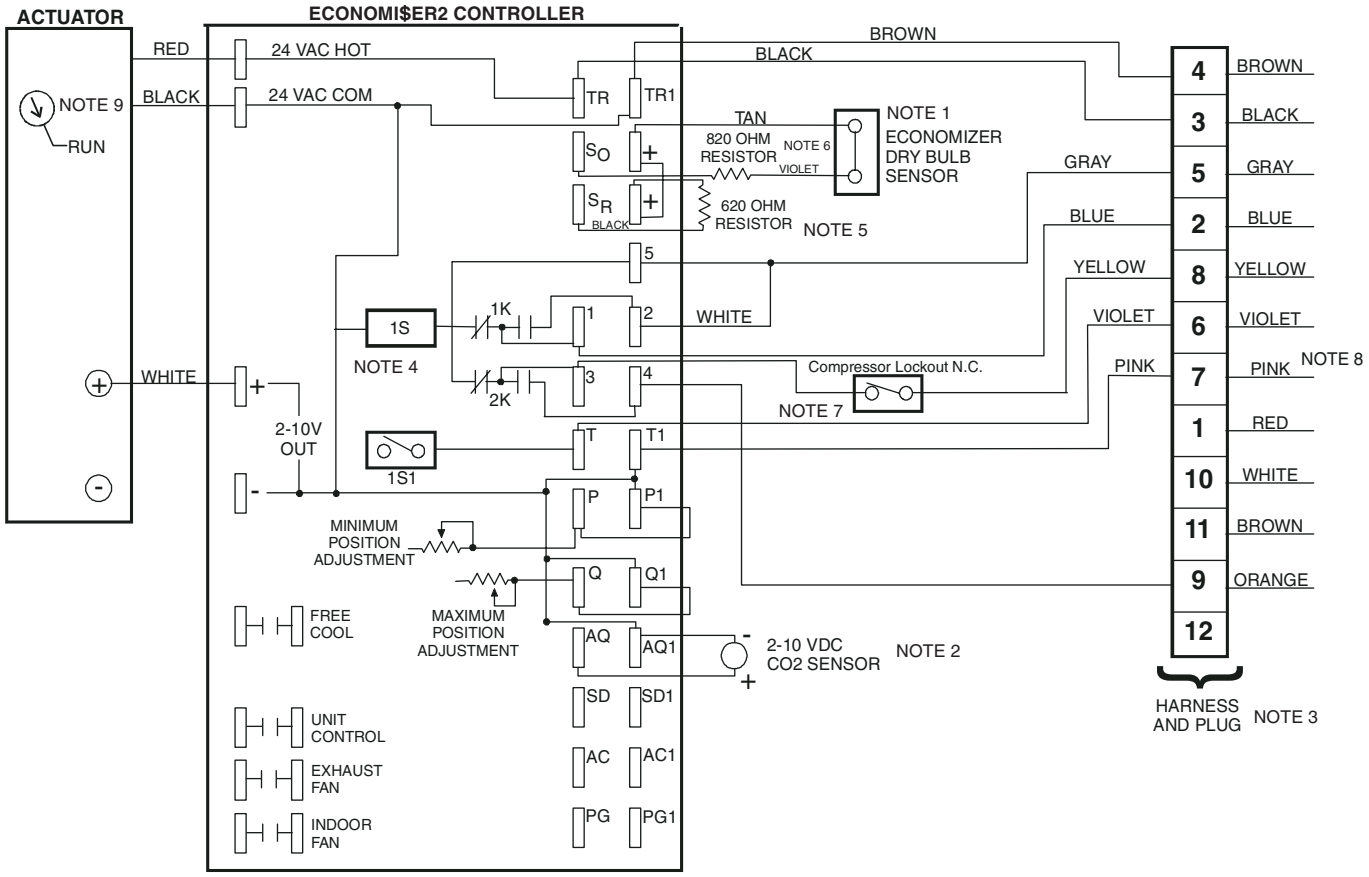
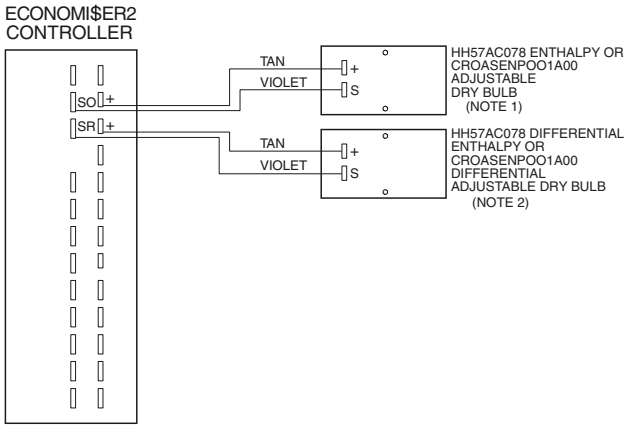


Fig. 30 — EconoMi$er Power Exhaust with Switch Outside of Actuator (Units Produced 11/5/2001 - 2/15/2002)



NOTES:
1. The standard EconoMi$er2 is shipped with a fixed dry bulb sensor. (Open 67 F — Close 52 F.) An adjustable dry bulb or enthalpy sensor can replace the fixed dry bulb. (See Note 6.)
2. CO_2 sensor is optional. Field-installed accessory. See rooftop price pages for ordering data and pricing. Power for CO_2 sensor should be provided by field-supplied transformer.
3. The HVAC unit is shipped with a jumper plug attached to the EconoMi$er2 harness. Remove the jumper plug and save for future use if economizer is removed. Connect the male side of plug (shown above) to the female side in HVAC unit.
4. 1S is an electronic switch that closes when powered by a 24 vac input.
5. Factory-installed 620-ohm, 1 watt, 5% resistor should be removed only when a HH57AC078 enthalpy sensor or CROASENR001A00 adjustable dry bulb is added to SR and + for differential sensing.
6. When replacing the fixed dry bulb sensor with an enthalpy or adjustable dry bulb, remove the 820-ohm resistor.
7. Compressor lockout (Open 35 F — Close 50 F).
8. See EconoMi$er2 Installation Instructions for details on locating and wiring supply air (mixed air) sensor.
9. Switch on actuator must be in run position for economizer to operate.
10. A 2-stage thermostat is recommended.
11. Before troubleshooting wiring, ensure that all the correct sensors have been installed (refer to EconoMi$er2 Installation Instructions).

Fig. 31 — EconoMi$er2 Wiring (For Units Produced 2/18/02 - Present)



NOTES:
1. Violet wire from SO terminal has a factory-installed 820-ohm in-line resistor. This resistor must be removed when replacing the standard fixed dry bulb with an optional enthalpy or adjustable dry bulb.
2. The standard economizer has a 620-ohm resistor between terminals SR and +. This resistor must be removed when adding differential enthalpy or differential adjustable dry bulb.

Fig. 32 — Differential Enthalpy Wiring for EconoMi$er2

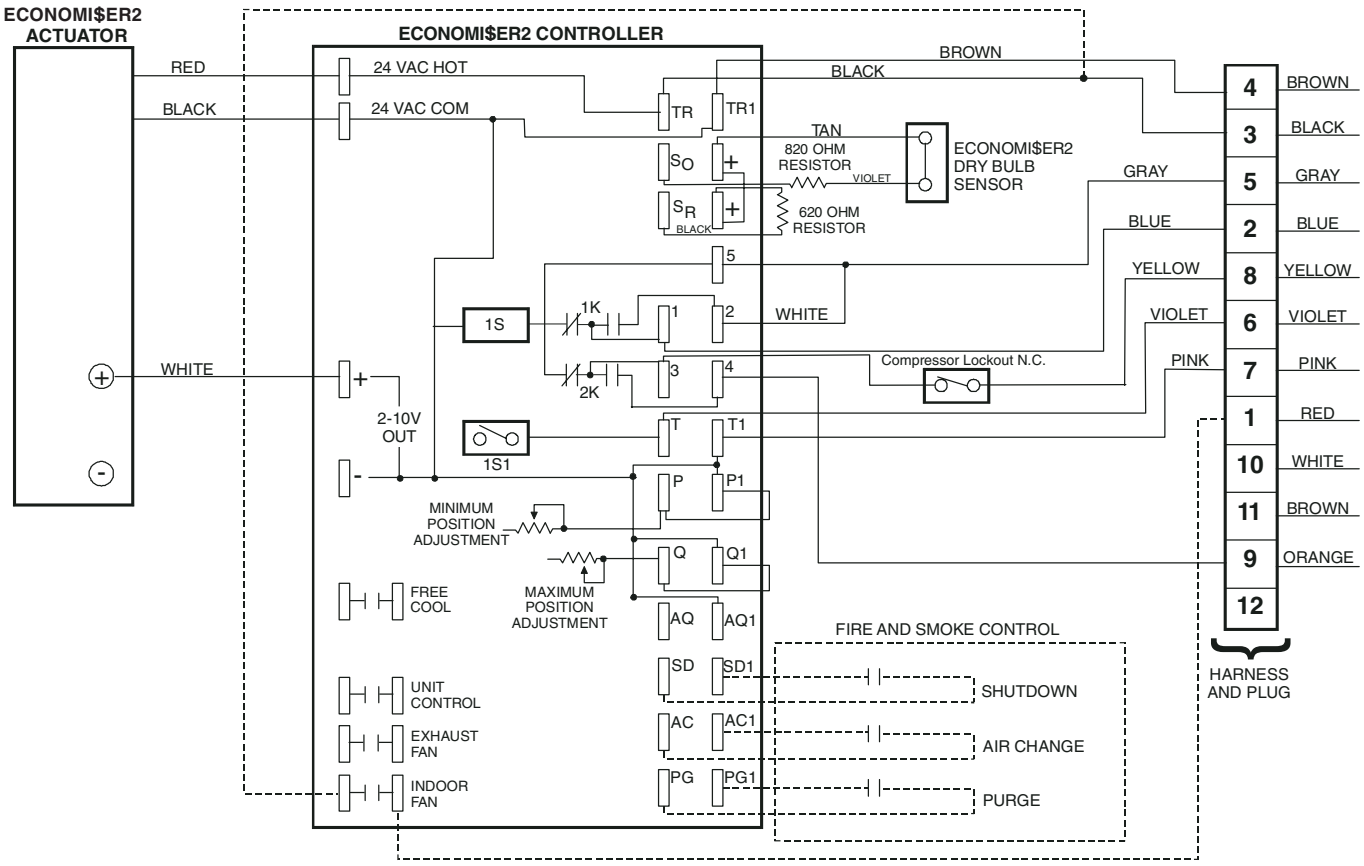


Fig. 33 — Fire and Smoke Control Wiring for EconoMi$er2

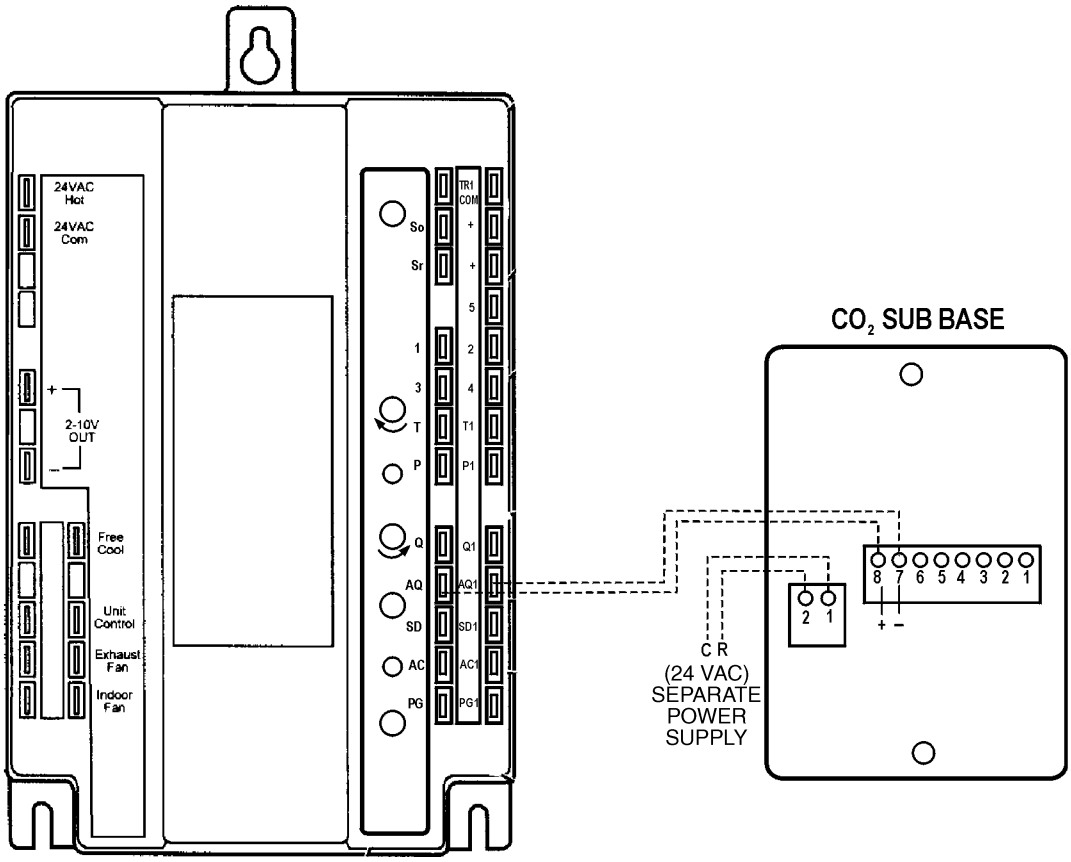
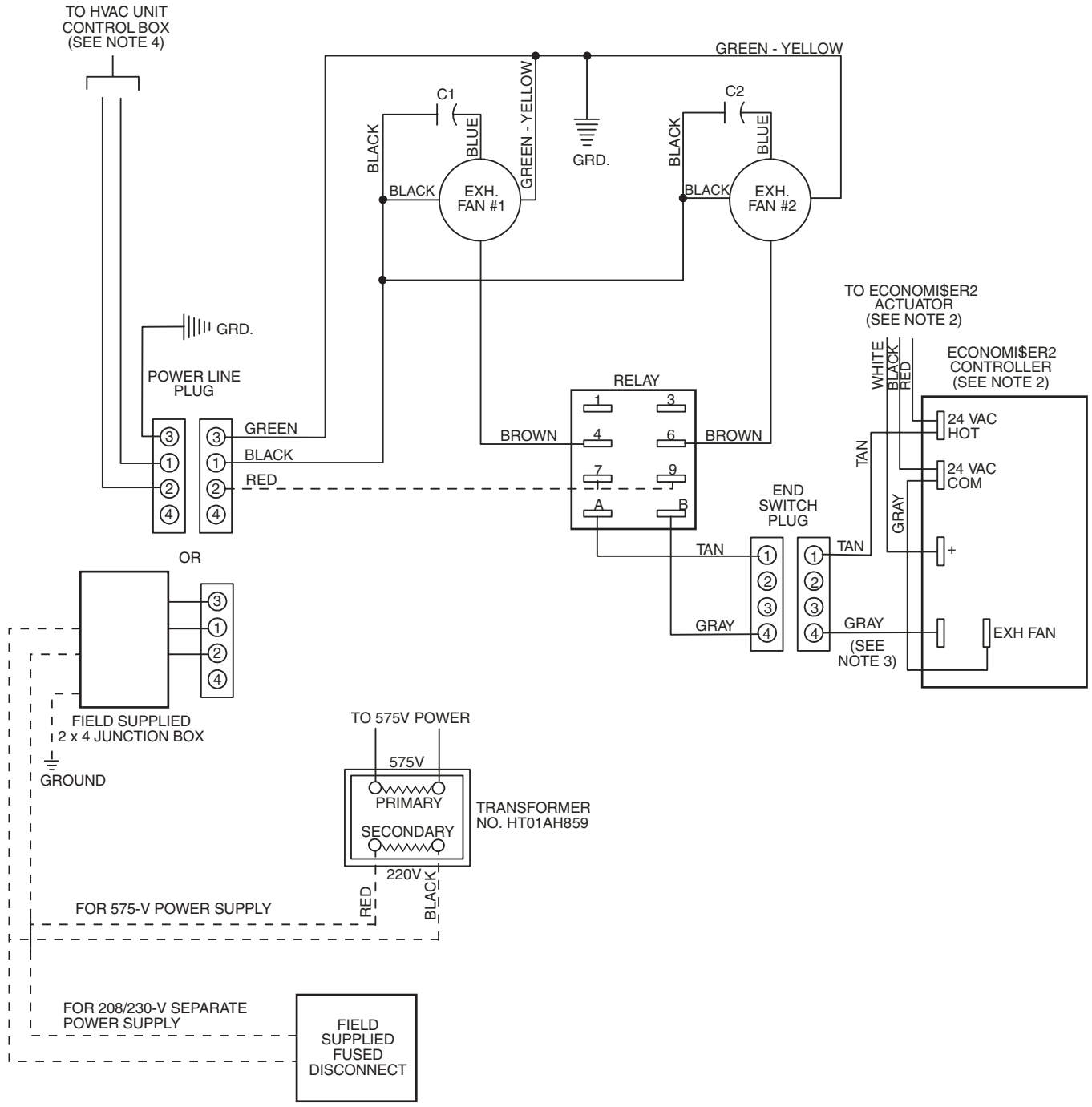


Fig. 34 — Indoor Air Quality Sensor Wiring for EconoMi$er2



NOTES:
1. 575 V transformer No. HT01AH859 is ordered separately from power exhaust.
2. EconoMi$er2 actuator and controller are shipped with the EconoMi$er2 — not with power exhaust.
3. Connections from End Switch plug to the EconoMi$er2 controller are made by installer.
4. If a single power source is to be used, size wire to include power exhaust MCA and MOCP.

   Check MCA and MOCP when power exhaust is powered through the unit. Determine the new MCA including the power exhaust using the following formula:

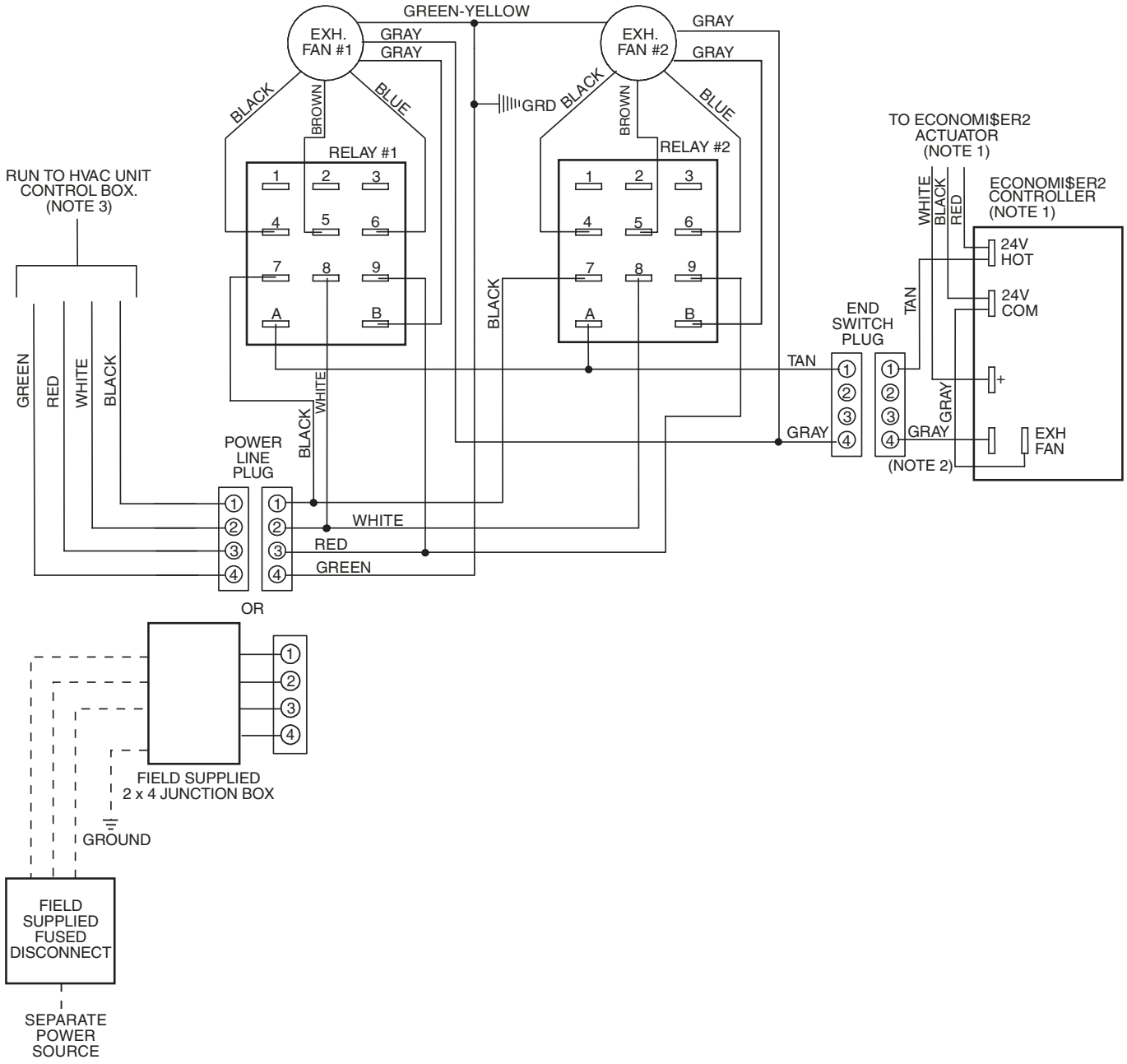
   MCA New = MCA unit only + MCA of Power Exhaust

   For example, using a 48HJD006---5 unit with MCA = 28.9 and MOCP = 35, with CRPWREXH030A00 power exhaust.

   MCA New = 28.9 amps + 1.6 amps = 30.5 amps

   If the new MCA does not go over the MOCP published, then MOCP would not change. The MOCP in this example is 35 amps, the MCA New is below 35, therefore the MOCP is OK. If “MCA New” is larger than the published MOCP, raise the MOCP to the next larger size. For separate power, the MOCP for the power exhaust will be 15 amps per NEC.

Fig. 35 — EconoMi$er2 Power Exhaust Wiring — 208/230 V and 575 V Units



NOTES:
1. EconoMi$er2 actuator and controller are shipped with the EconoMi$er2 — not with power exhaust.
2. Connections from End Switch Plug to the EconoMi$er2 controller are made by installer.
3. If a single power source is to be used, size wire to include power exhaust MCA and MOCP.

   Check MCA and MOCP when power exhaust is powered through the unit. Determine the new MCA including the power exhaust using the following formula:

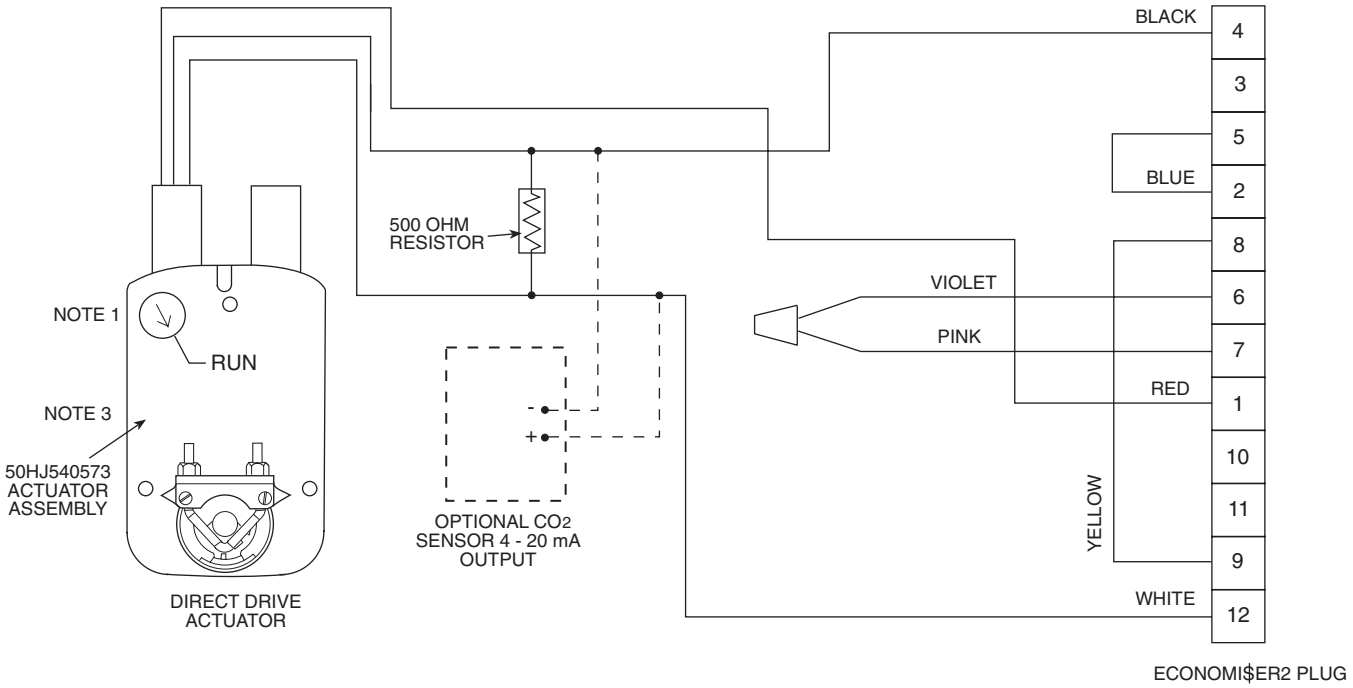
   MCA New = MCA unit only + MCA of Power Exhaust

   For example, using a 48HJD006---5 unit with MCA = 28.9 and MOCP = 35, with CRPWREXH030A00 power exhaust.

   MCA New = 28.9 amps + 1.6 amps = 30.5 amps

   If the new MCA does not go over the MOCP published, then MOCP would not change. The MOCP in this example is 35 amps, the MCA New is below 35, therefore the MOCP is OK. If “MCA New” is larger than the published MOCP, raise the MOCP to the next larger size. For separate power, the MOCP for the power exhaust will be 15 amps per NEC.

Fig. 36 — EconoMi$er2 Power Exhaust Wiring — 460 V Units



NOTES:
1. Switch on actuator must be in run position for economizer to operate.
2. PremierLink™ control requires that the standard 50HJ540569 outside-air sensor be replaced by either the CROASENR001A00 dry bulb sensor or HH57A077 enthalpy sensor.
3. 50HJ540573 actuator consists of the 50HJ540567 actuator and a harness with 500-ohm resistor.

Fig. 37 — EconoMi$er2 Wiring (With PremierLink or 4-20 mA Control)

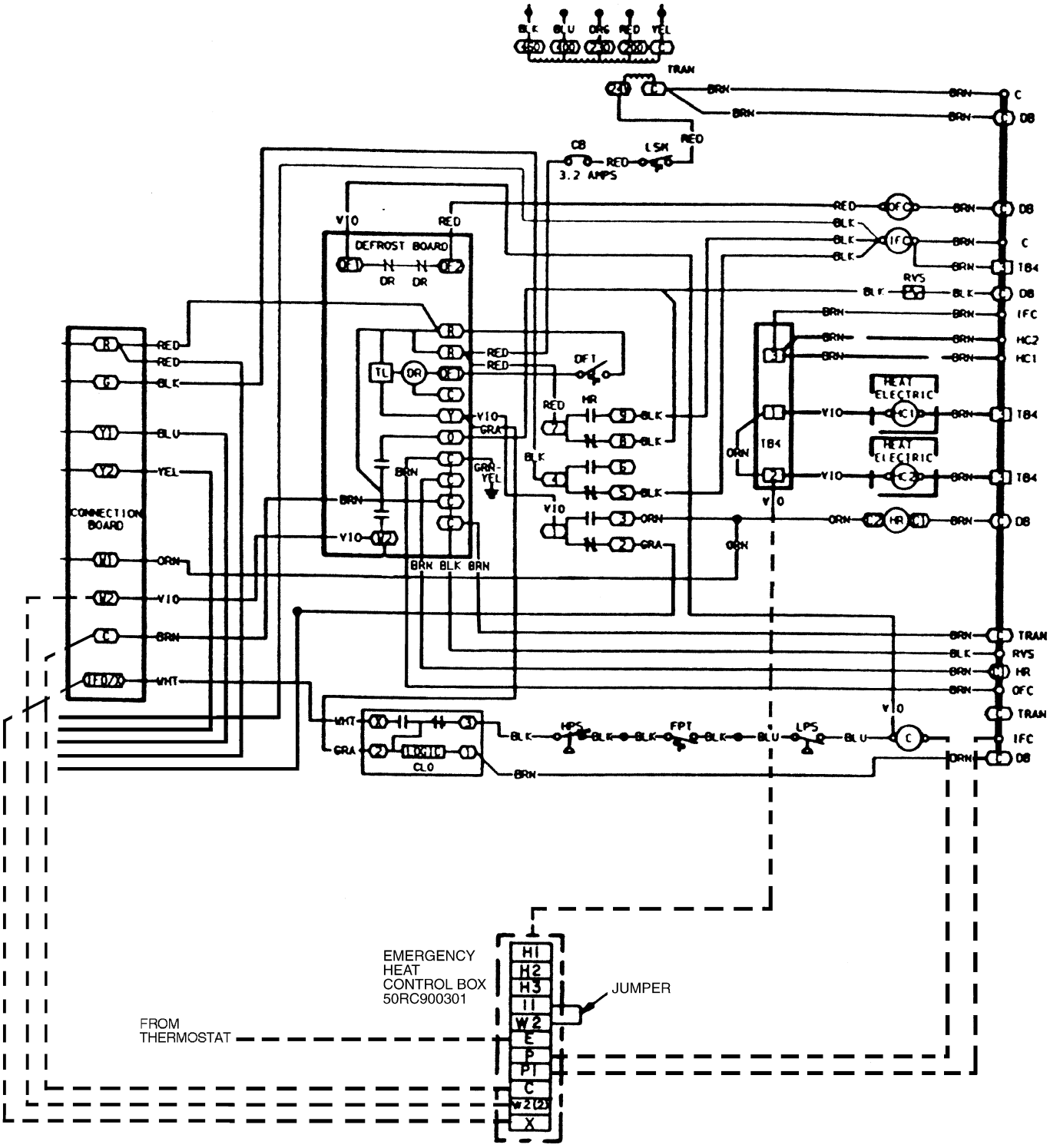


Fig. 38 — Emergency Heat Control Wiring With Single-Stage Electric Heater and Single Compressor, 50TFQ004-007

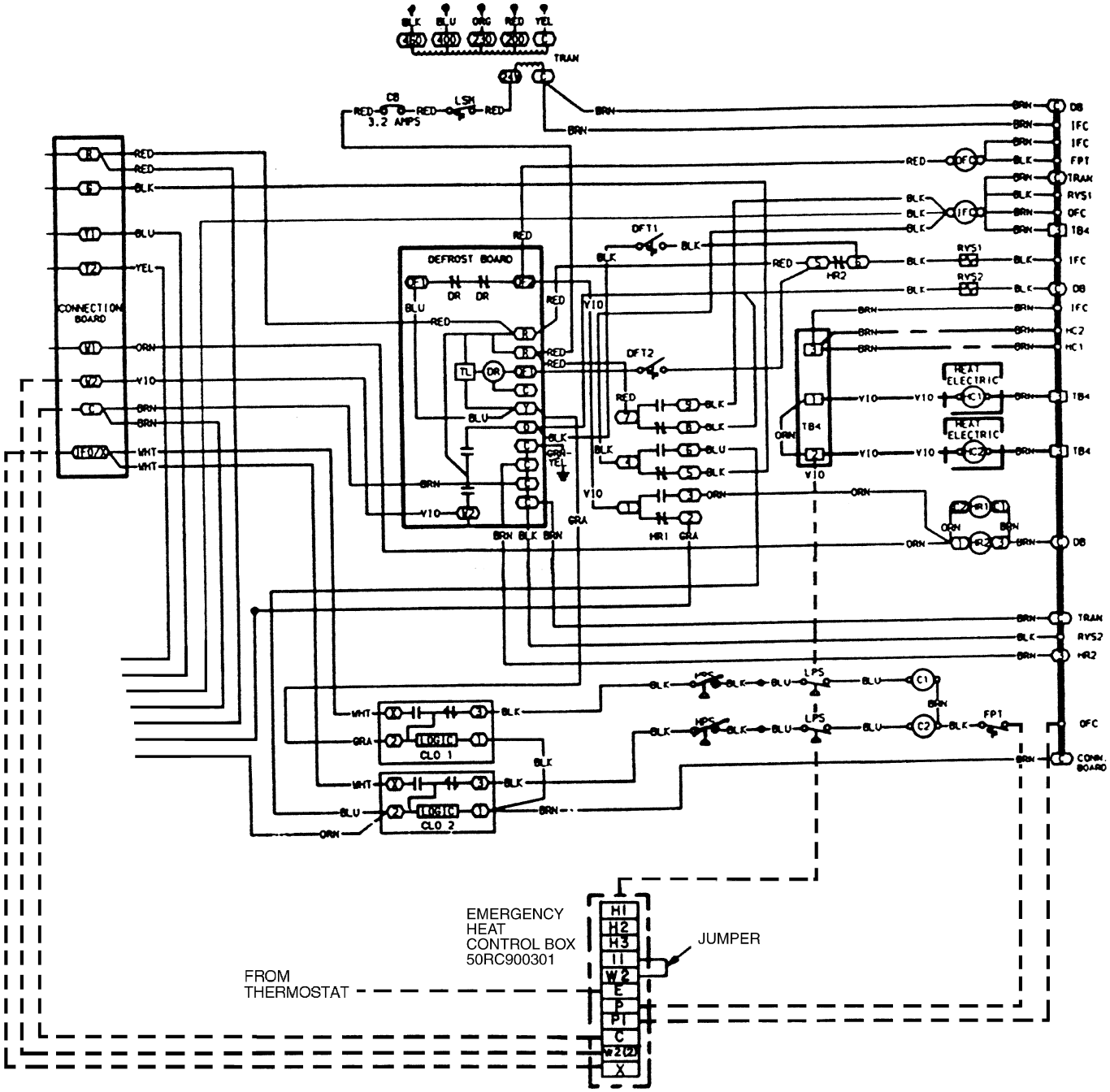


Fig. 39 — Emergency Heat Control Wiring With Single-Stage Electric Heater and Two Compressors, 50TFQ008-012

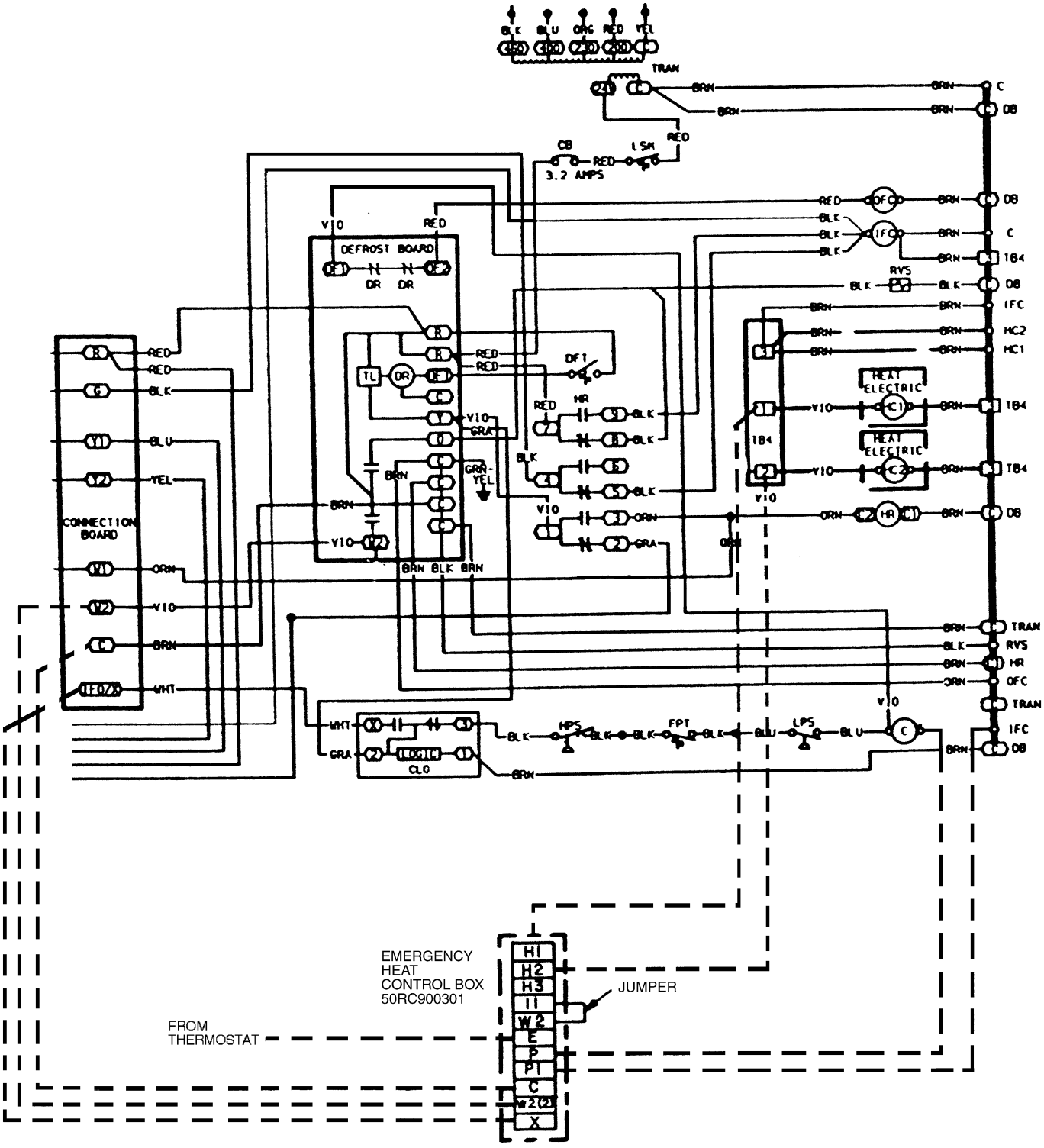


Fig. 40 — Emergency Heat Control Wiring With 2-Stage Electric Heater and Single Compressor, 50TFQ004-007

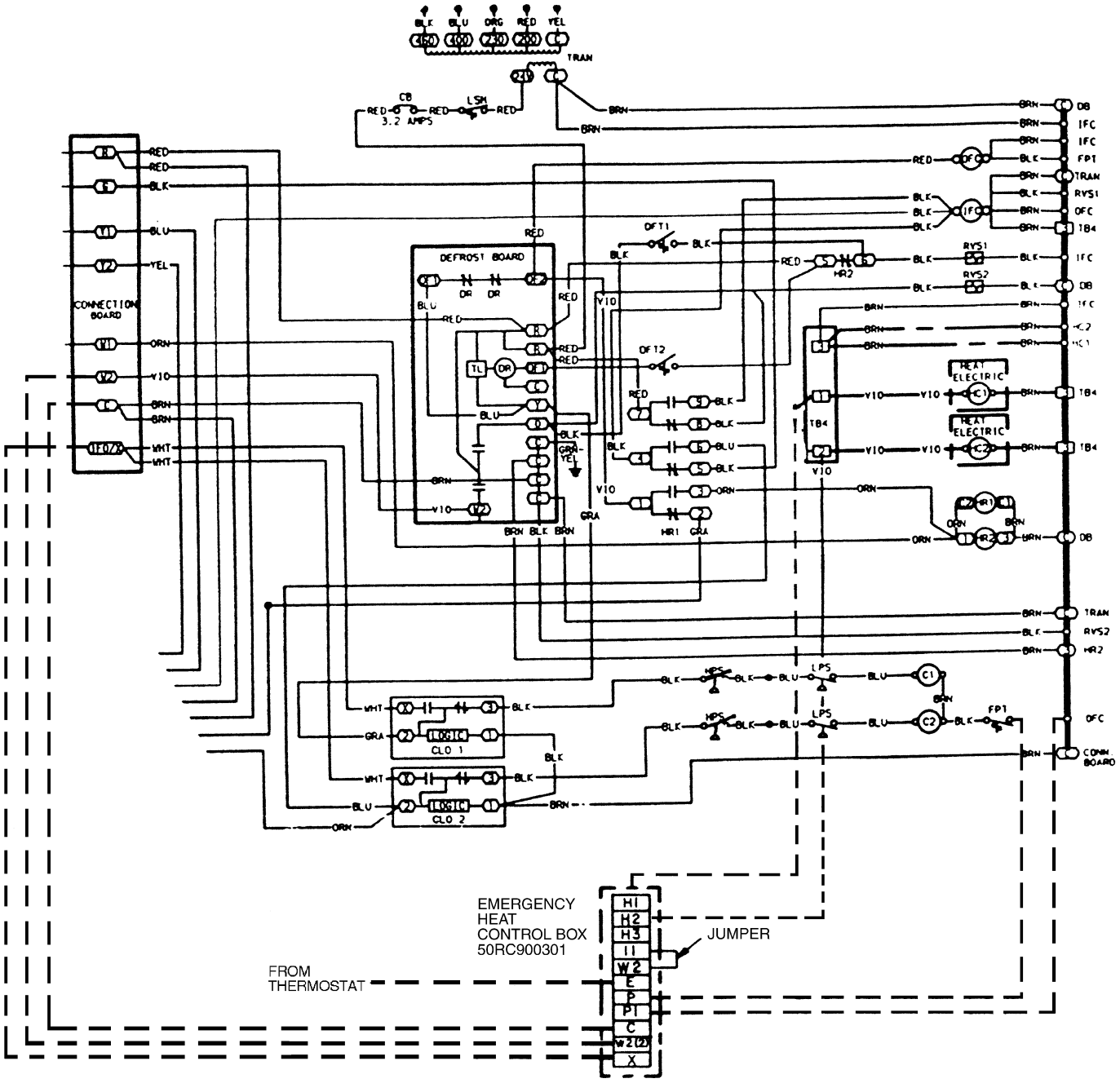


Fig. 41 — Emergency Heat Control Wiring With 2-Stage Electric Heater and Two Compressors, 50TFQ008-012

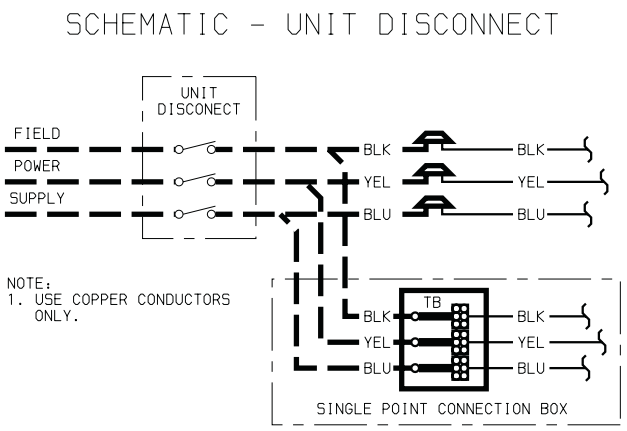
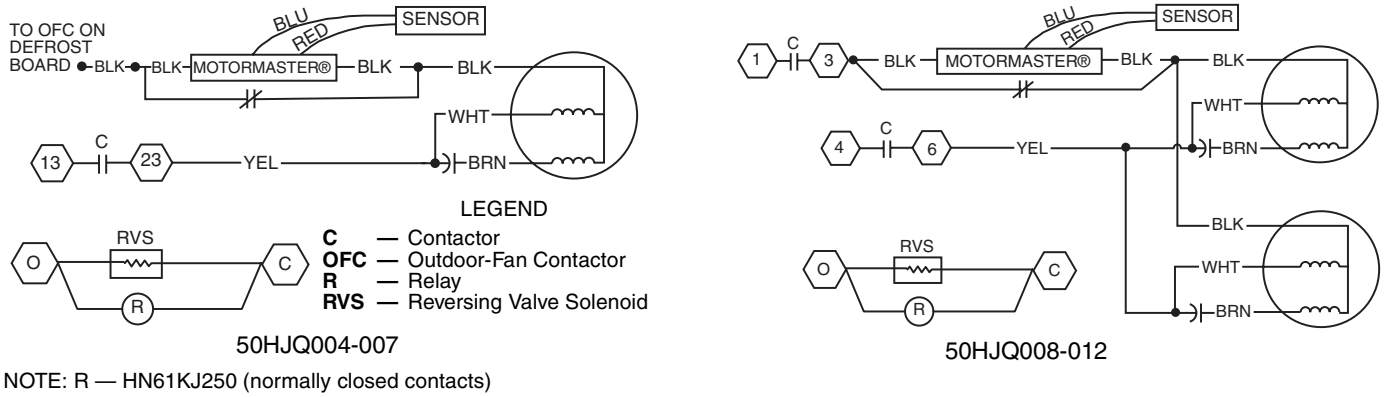
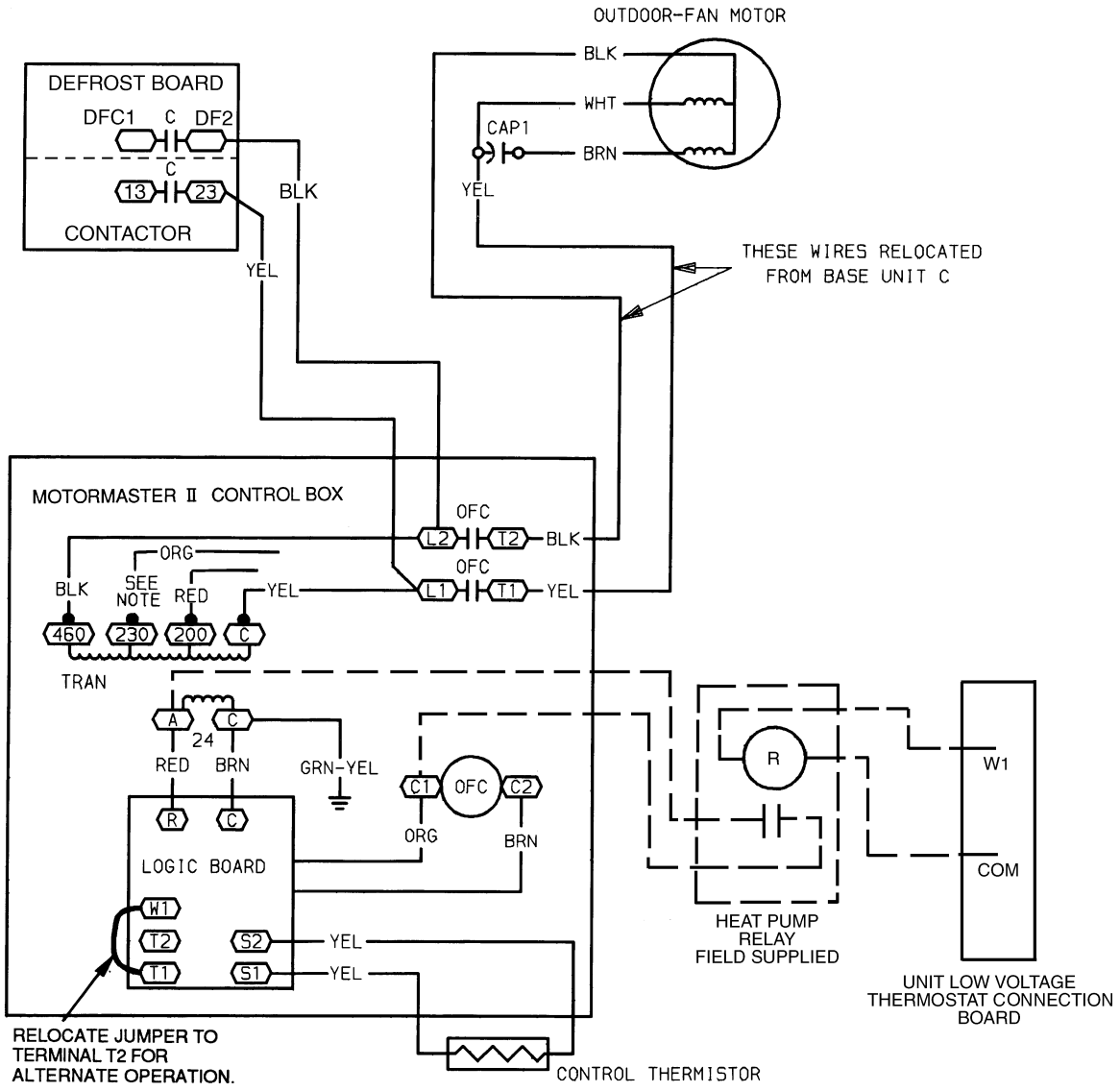


Fig. 42 — Factory-Installed Non-Fused Disconnect Wiring



NOTE: R — HN61KJ250 (normally closed contacts)

Fig. 43 — Motormaster® I Control Wiring Details

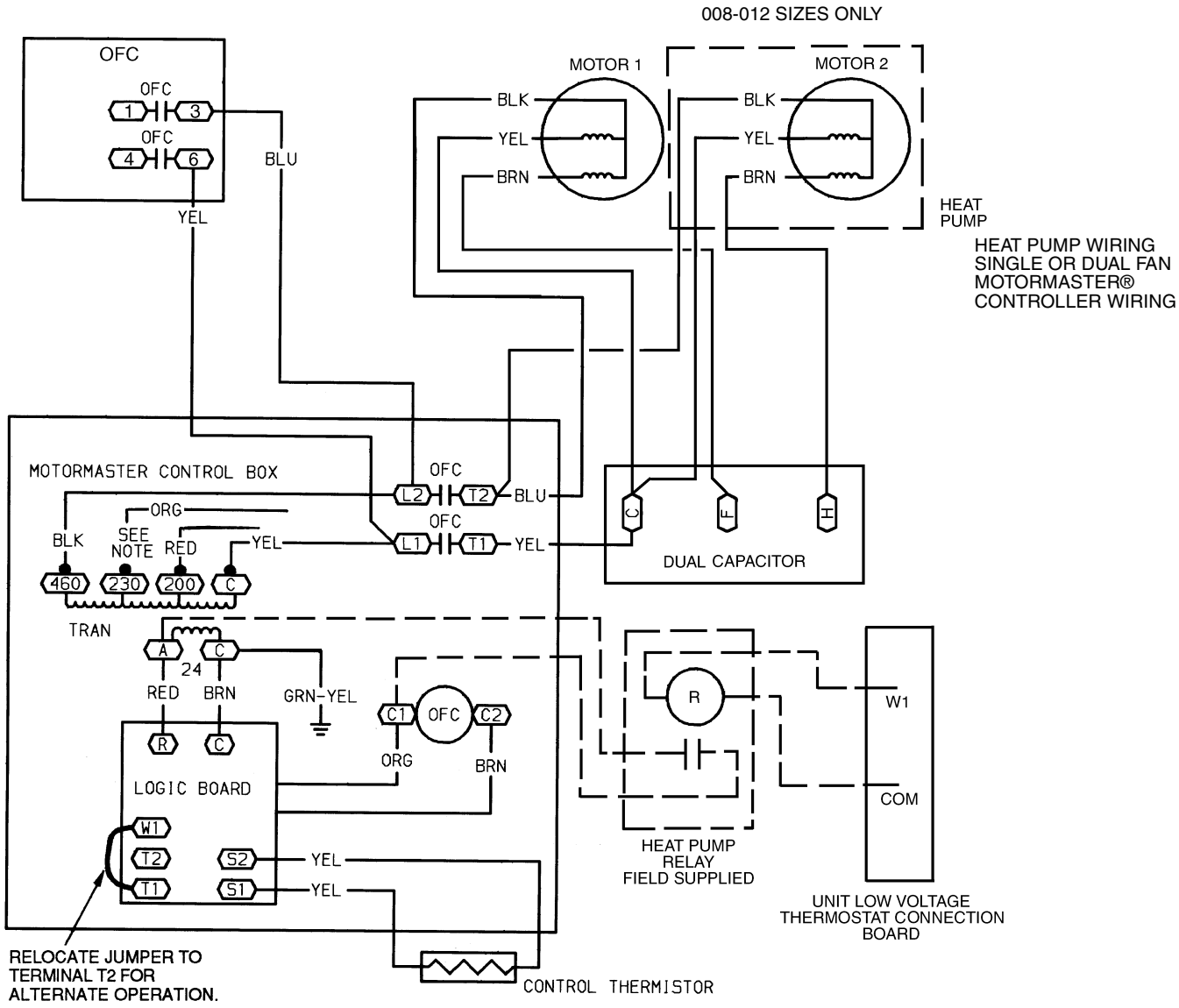


LEGEND

C — Contactor
OFC — Outdoor-Fan Contactor
TRAN — Transformer

NOTE: Motormaster® II transformer is wired for 460-v supply; it must be rewired for 208/230-v application. Be sure to insulate unused tap. Refer to color code.

Fig. 44 — Motormaster II Control Wiring Schematic — Sizes 004-007

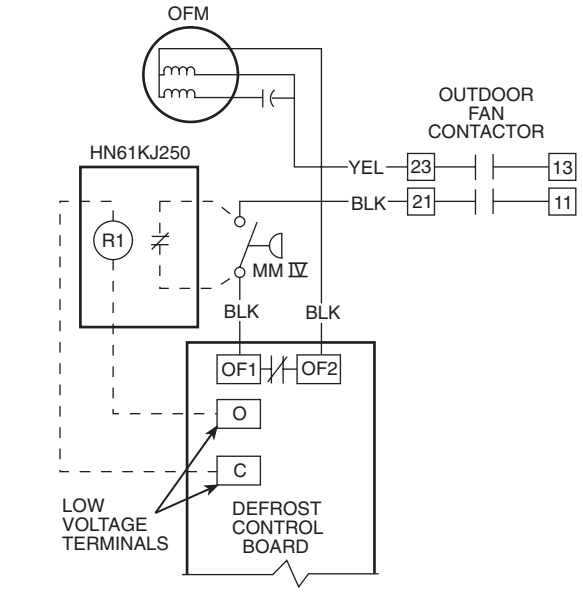


LEGEND

C — Contactor
OFC — Outdoor-Fan Contactor
TRAN — Transformer

NOTE: Motormaster® II transformer is factory wired for 460-v supply; it must be rewired for either 208 or 230-v applications. Be sure to insulate unused tap. Refer to color code.

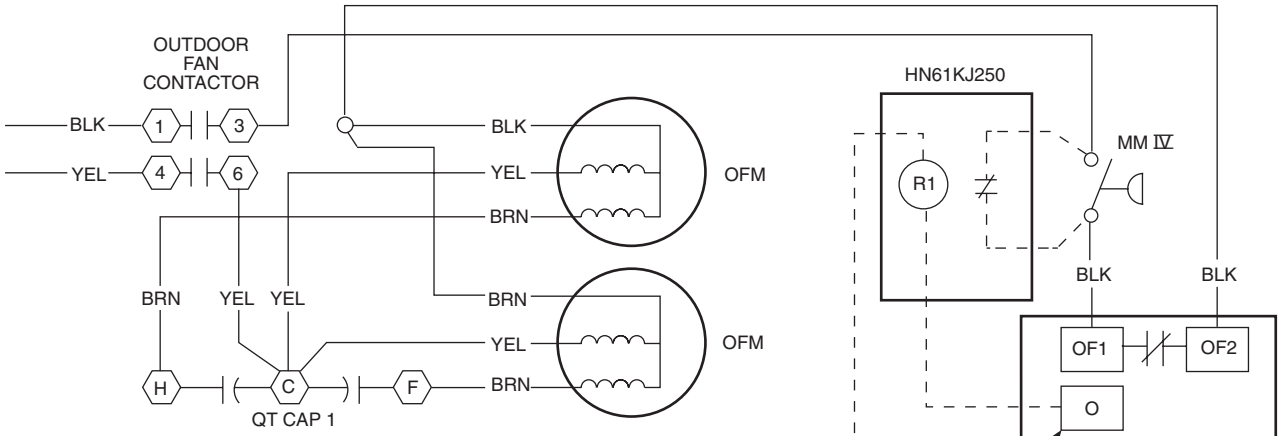
Fig. 45 — Motormaster II Control Wiring Schematic — Sizes 008-012



LEGEND

OFM — Outdoor Fan Motor
Aux Wiring for Heat Pump
R1 HN61KJ250 or Equivalent
Motormaster® IV Controller
(32LH900003 Pressure Switch)

Fig. 46 — Motormaster IV Control Wiring Schematic — Sizes 004-007



LEGEND

CAP — Capacitor
OFM — Outdoor Fan Motor
QT — Quadruple Terminal
Aux Wiring for Heat Pump
R1 HN61KJ250 or Equivalent
Motormaster IV Controller
(32LH900003 Pressure Switch)

Fig. 47 — Motormaster IV Control Wiring Schematic — Sizes 008-012

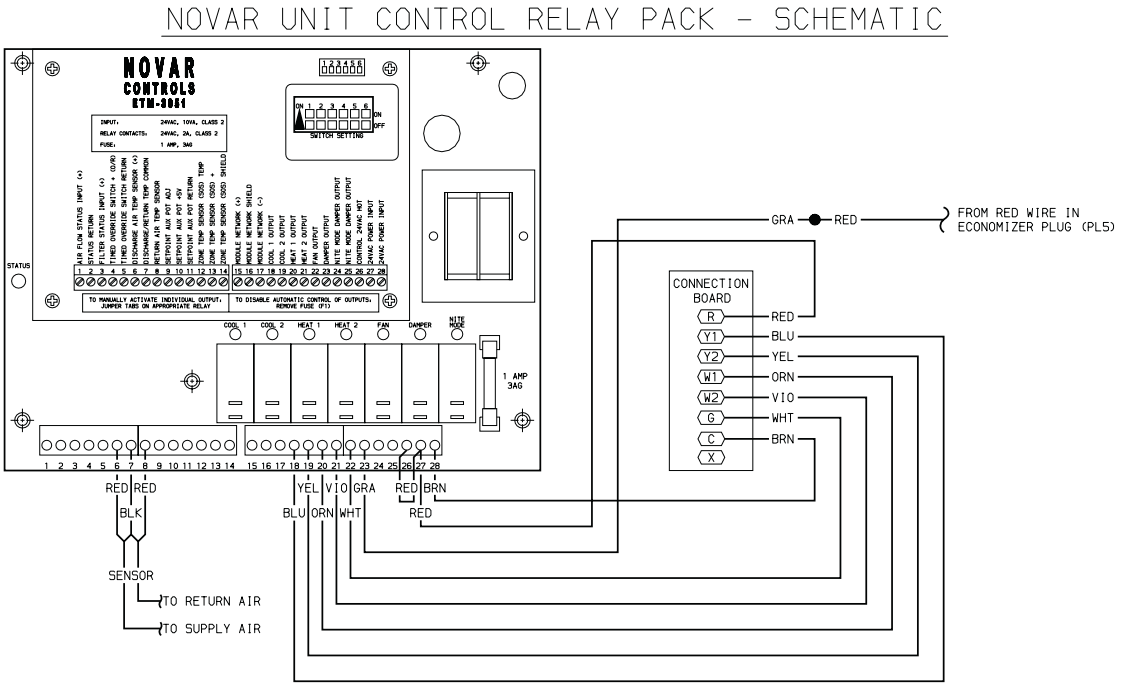


Fig. 48 — Novar Controls Wiring, EMT3051

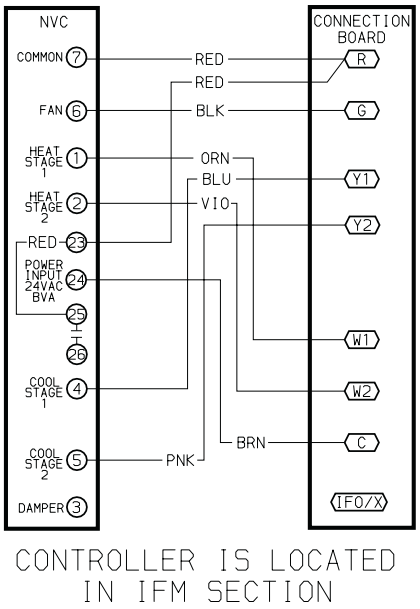
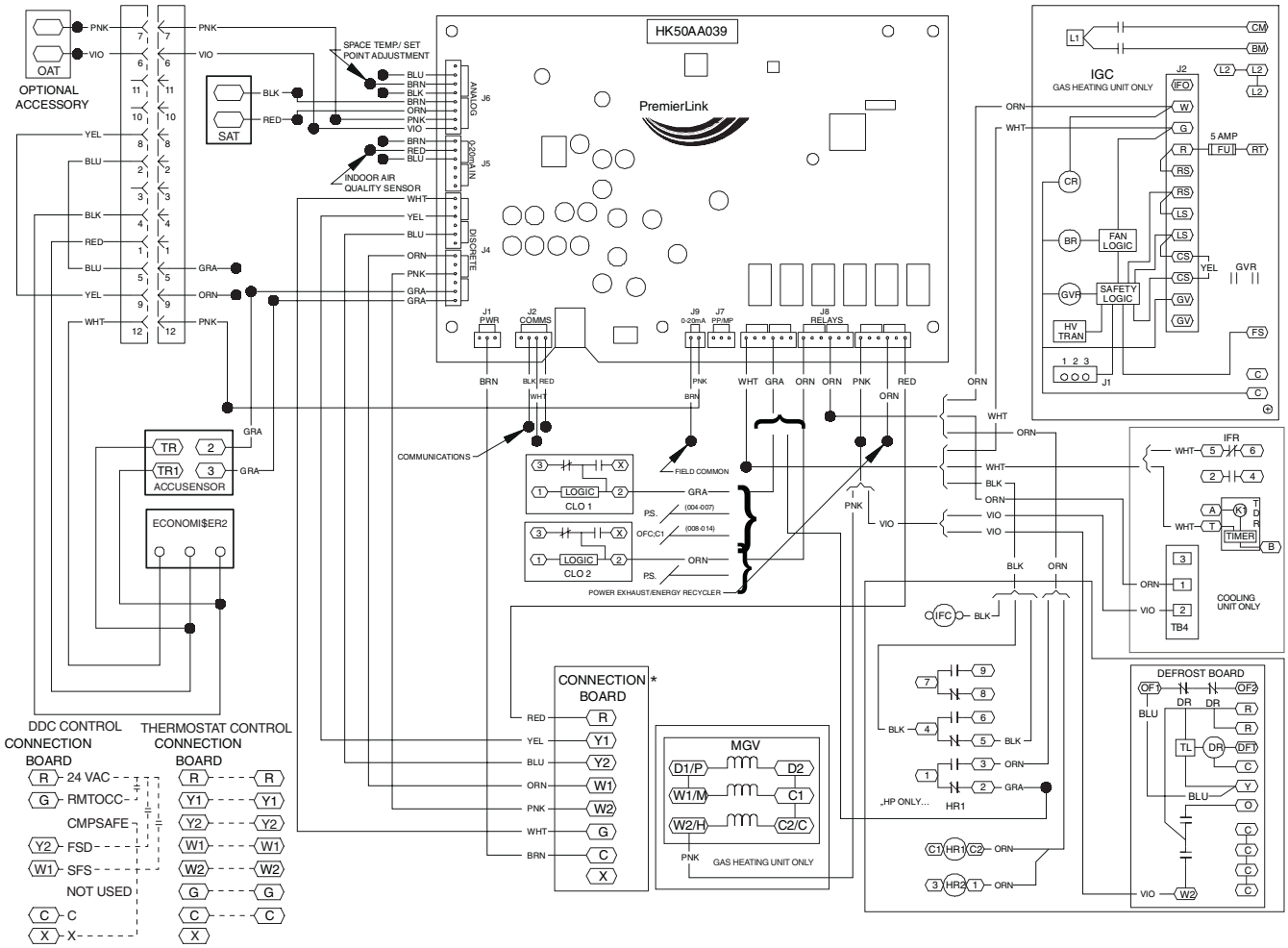


Fig. 49 — Novar Controls Wiring, EMT2024



*When connecting DDC or thermostat controls, wire to connection board. Do not wire directly to PremierLink™ board.

Fig. 50 — Typical PremierLink Controls Wiring

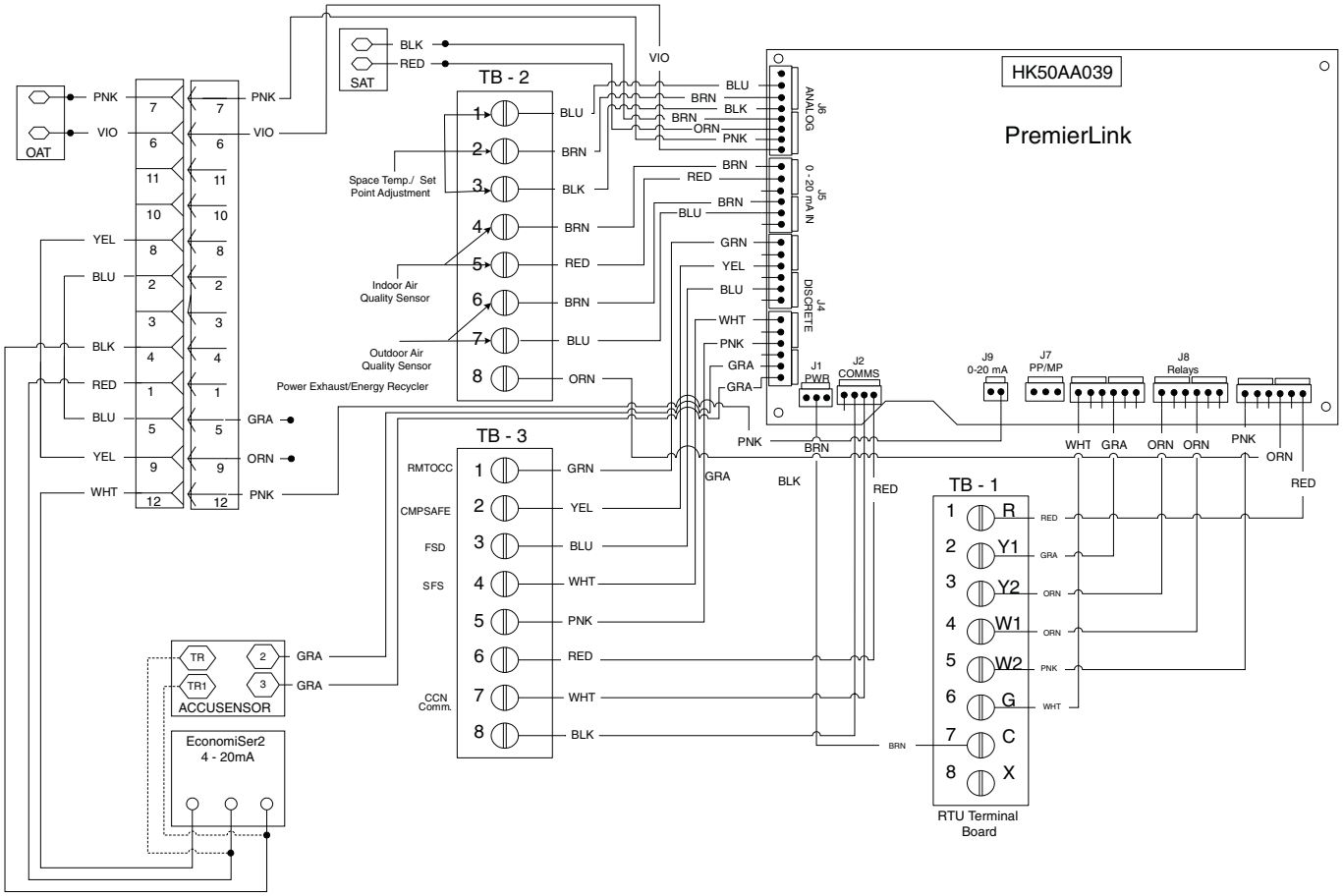


Fig. 51 — PremierLink™ Controls with Dual Terminal Block (Units Produced 10/02 - Present)

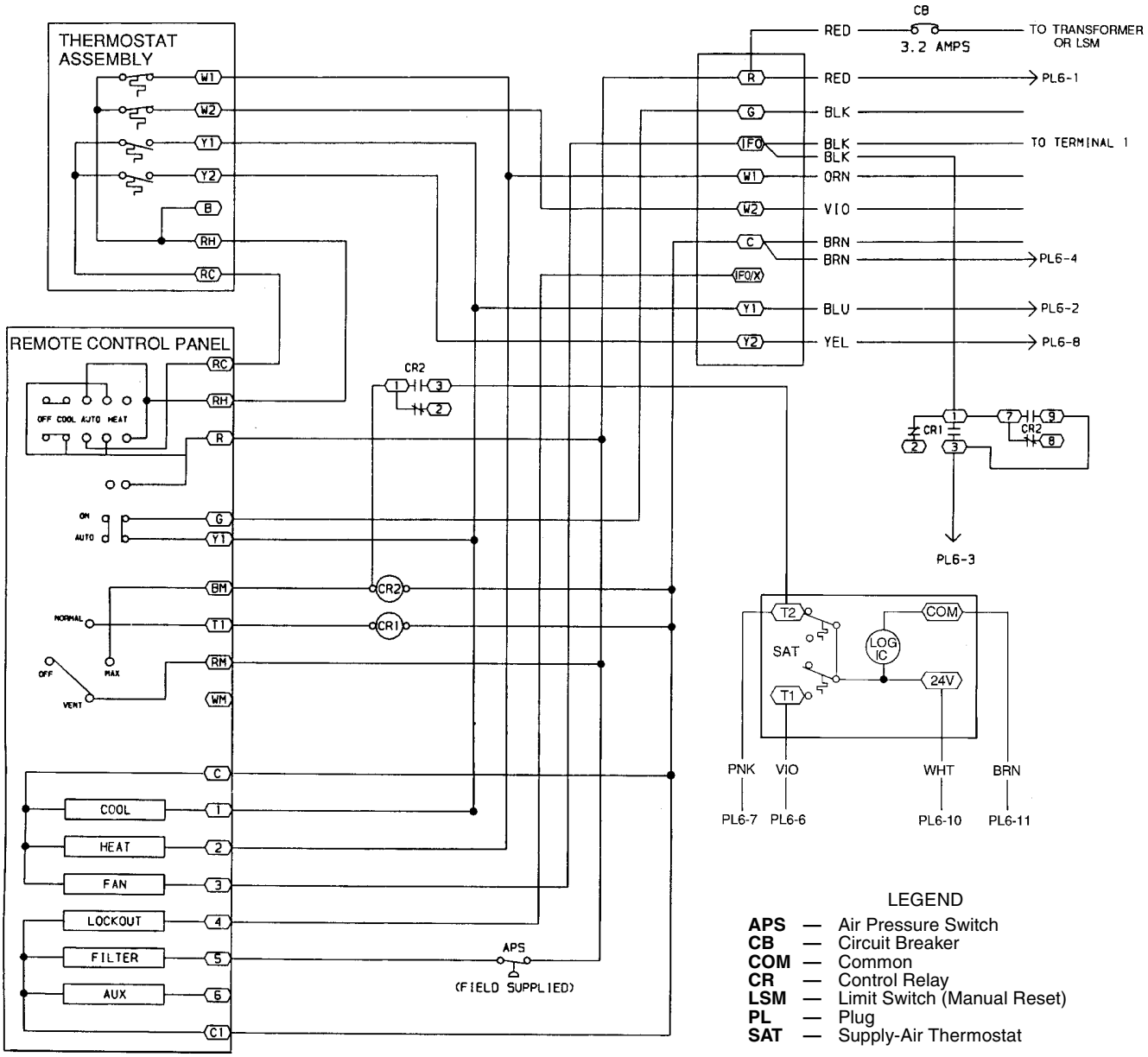
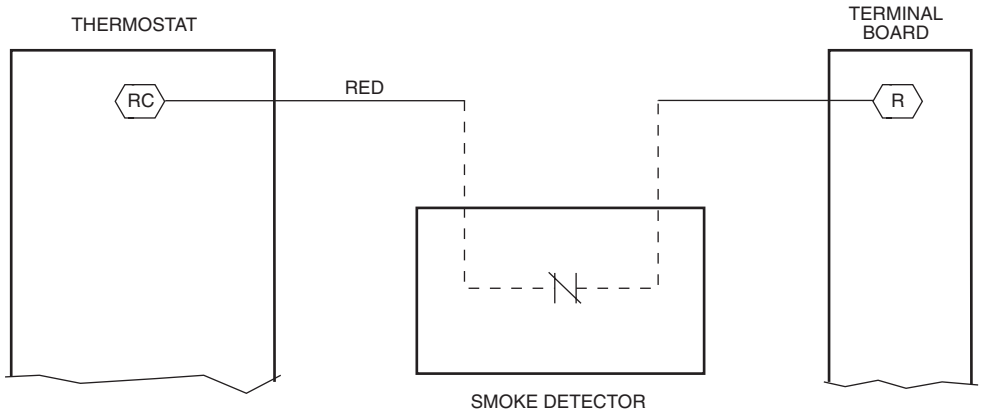
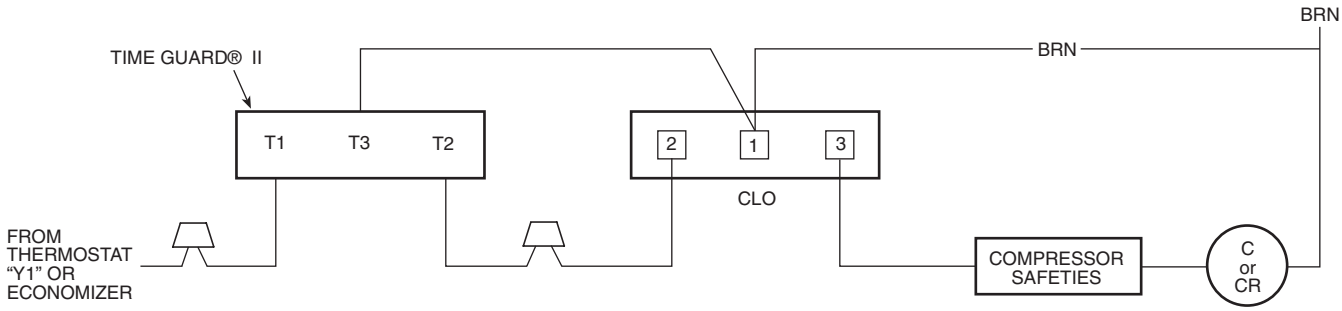


Fig. 52 — Remote Control Panel Wiring

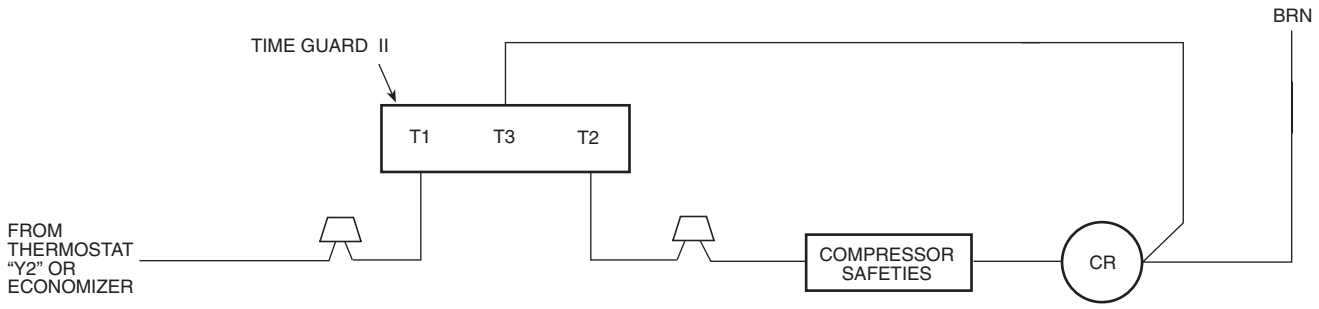


NOTE: Break the Red wire from terminal “RC” on thermostat to terminal “R” on the terminal board.

Fig. 53 — Smoke Detector Unit Shutdown (Size 004-012 Units)



SINGLE COMPRESSOR UNITS



DUAL COMPRESSOR UNITS

Fig. 54 — Time Guard II Control Wiring

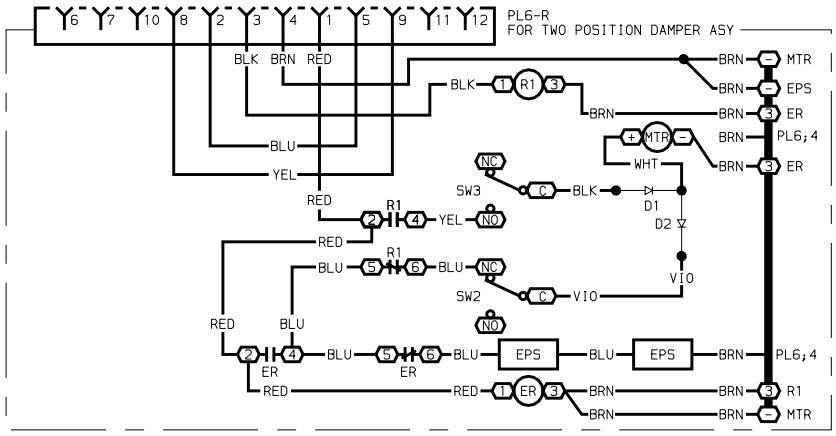
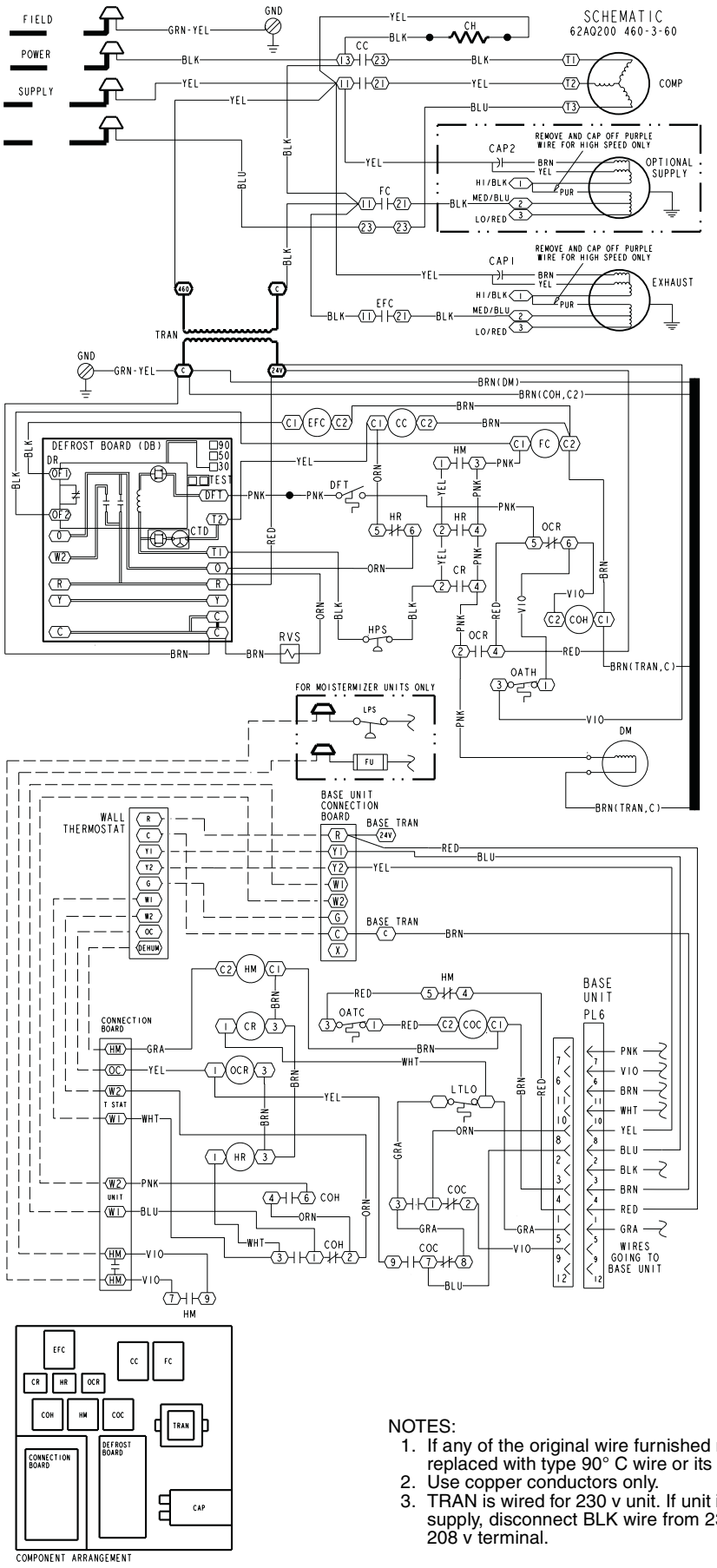


Fig. 55 — Two-Position Damper Wiring



NOTES:
1. If any of the original wire furnished must be replaced, it must be replaced with type 90° C wire or its equivalent.
2. Use copper conductors only.
3. TRAN is wired for 230 v unit. If unit is to be run with 208 v power supply, disconnect BLK wire from 230 v terminal and connect to 208 v terminal.

Fig. 56 — Typical Wiring Schematic for 62AQ Energy$Recycler as a Field-Installed Accessory